THE
LARYNGOSCOPE.

VOL. XLVI MARCH, 1936. No. 3

THE PRESENT STATUS OF PLASTIC NASAL SURGERY.*

DR. SAMUEL COHEN, Philadelphia.

I am presenting this subject because it is my belief that this field, rightfully belonging to those specializing in rhinology, has too long been neglected by us, and I hope that this paper may spur some of you on to investigate the subject, so that needed advances may be attained and broadcast to all those interested. Our lack of interest, plus public demands for work in this field, means a great opening for many not fully qualified scientifically. Those working in this field often do not properly divulge their definite discoveries but hold on to them. Occasionally procedures are advanced that bring not only failures but even dangerous complications, as the paraffin method of rebuilding the external nose, producing unsightly tumors called parafinomas.

When does the nose need a correction?

First — In persons disfigured in such a way as to feel themselves out of the ordinary in an unpleasant way, so that calm social intercourse is disturbed.

Second — It is important for us as rhinologists to note that many of these disfiguring conditions also cause definite interference in normal nasal physiology, often causing obstructions to breathing not amenable to ordinary surgical procedures

*Read before the Laryngological Society of Philadelphia, Nov. 20, 1935.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Jan. 14, 1936.

in vogue by the average rhinologist, such as the submucous resection, polyp removal, cautery, etc., and patients leave our hands unimproved, or in worse condition, after an improper procedure has been performed.

Let us take for example: The patient with a dependent tip, whose nose is rather narrow and without any marked septal deflection, and who complains of obstructed breathing. Such cases frequently have submucous resections performed without any beneficial result. Why? Because the deflected septum was not the cause of the nasal obstruction, but the dependent tip was. It is only the raising of the tip, which both shortens the nose and widens the nostrils, that will improve the breathing and, incidentally, the patient's appearance. In going over this phase with my patients, I ask them to lift their own nasal tips to see the marked improvement in breathing. The simple removal of a triangular wedge from the quadrilateral cartilage and suturing, preceded by general skin elevations, constitutes the operative procedure. It takes less time than a good submucous, and the procedures are left to outsiders. Why doesn't the rhinologist perform these procedures? Because most of us have not taken the trouble to follow the progress in this field, and because some, for some antiquated, twisted reason, look askance at the work altogether.

A patient with a markedly twisted nose suffers not only from his facial disfigurement but frequently with breathing difficulty. He goes to his rhinologist and what is done? A submucous resection; but if the rhinologist would only think further ahead he would see that it is not only the septal deformity that is responsible for the difficulty, but that the external deformity is of paramount importance; that correction of the septum alone will not answer the purpose and frequently the outside is so crooked that it is physically impossible to get a straight septum without correcting the external nose. The correction of a twisted nose, whether of the entire nose or part of it, is a much more difficult procedure than the shortening or tip raising operation; but in the average case, by the average operator, with proper patience, the procedure can be mastered with pleasing results for all concerned.

Other disfigurements of the external nose may also cause nasal obstructions, and you will see the frequency with which cases pass through our hands unaided, and often even harmed, because of our temerity or lack of knowledge.

Patients with saddle nose, not syphilitic or complicating some form of atrophic rhinitis, but one that has resulted from an injury, frequently have several complaints. First, their appearance is unsightly; second, they are unnecessarily suspected of being syphilitic or pugilistic; third, they often suffer from a nasal obstruction.

I have known patients with small deformities, say a bulging of one side of the nasal dome or tip, to consult a surgeon, who, not being familiar with the anatomy, attempts correction by cutting out pieces from the outside, thus leaving dents or scars. One young man I know had six operations performed for such a deformity, unfortunately by one not versed in these procedures, and the end-results were worse than when operative corrections were first started.

It is knowledge of the bones and cartilages involved in a particular deformity, knowing how to get to them, and by either excising portions, displacing or replacing them, that proper results can be attained. It is for such cases that there is a crying need for more discussion, more cadaver work.

In considering the nose from the plastic surgeons' viewpoint a few things should be noted. The angle formed by the nasal bones and the frontal (glabellar angle) should be about 125 to 135 degrees. The angle formed by the columella and upper lip should be 90 to 105 degrees. The nose should not be larger than the distance from the root of the columella to the tip of the chin.

Let me recall some points in anatomy: The external nose is a protective tent-like arrangement consisting of two portions: *1.* a bony immovable portion made up of the nasal bones, the nasal processes of the superior maxilla, the rim of the pyriform fossa and that part of the frontal bone that joins the nasal bones and the nasal processes of the superior maxilla; *2.* a cartilaginous portion, the upper lateral cartilage and septal cartilage, the lower laterals and the remaining dense fibrous tissue with some sesamoid cartilages embedded therein.

Remember that the nasal bones are thin below and very thick and powerful at their connection with the frontal bones; that here the thickness is often one-quarter inch, and that this powerful union must be broken and replaced into a new and proper position in order to give the proper nasofrontal angle.

Note that the upper lateral cartilages are firmly joined with the nasal bone and nasal process of the superior maxilla by fibrous tissue but are part and parcel of the quadrilateral septal cartilage. In other words the lateral and septal cartilages form an irregular umbrella-like arrangement. Take note also that the lower lateral cartilages, those that form the nasal tip, have lateral and medial plates. In other words the nose has five cartilages and a few sesamoid cartilages buried in fibrous tissue.

Take note that the external nose is well supplied with blood vessels except at the tip, and healing takes place exceedingly well in all parts of the nose excepting the tip. Here, special care must be used in the operative procedure; a bad move, and disaster, even gangrene of the tip may take place.

A nose, from the purely rhinological standpoint, is composed of turbinates, sinus, etc. From the plastic viewpoint the nasal bones and cartilages must be well visualized, deviation from the normal accounted for and a corrective procedure devised that will fit the particular case. No two cases are exactly alike.

A sad commentary on rhinologists is their lack of anatomical knowledge of nasal anatomy. Variations in agar nasi cells, unusual displacement of ethmoidal cells, absence of frontal cells calls for reams of reading matter; but the various positions of the upper or lower lateral cartilages, their positional variations in reference to the nasal bones, their connections to the quadrilateral cartilage or columnar cartilages, are glossed over; or here or there a few pages are written upon the subject then lost sight of. I try to impress upon the postgraduate students the importance of this anatomy, by saying that the external nose is mainly a play of cartilage and that this must be well understood before corrections are attempted.

As to etiology, suffice it to say that accidents, disease, and hereditary characteristics, form the main causes for disfigurements. We can do nothing about the heredity question, but as to disease and accidents we can advise certain precautions.

By accidents we mean mainly nasal fractures, and all these fractures are necessarily compound ones (the nasal mucosa is broken). Some of the older men still teach that nasal fractures should be conservatively handled, by which they mean that one should wait until all the swelling and infection is gone and

then try to reset and treat the fracture. This, one can emphatically state, is almost always wrong. Within a week enough tissue has been manufactured to cause a union of the bones in bad position and re-fracturing may become necessary, while if resetting is done soon after the accident and proper X-rays taken to confirm the positions, union in the proper position will take place, and no further procedures are needed. We should remember there are no strong muscles to pull the fragments the wrong way. Among the accidents we also note occasional incidents of nasal deformities due to submucous resections or infections and septal abscess formation following a submucous. The resultant deformity is a saddle nose. This may occur from removing too much of the supporting nasal arch, that is, that piece of the quadrilateral that projects just below the upper lateral cartilages; or by removing too much of the anterior edge of the quadrilateral cartilages; or by infection, which may follow a submucous.

First, you recall, a septal hematoma usually occurs. If this is not cleaned out quickly it may be followed by abscess formation, destruction of the protruding part of the quadrilateral cartilage, etc., and a saddle nose results.

I wish also to stress the possible formation of nasal deformities by the omission of the rhinologist. We all see cases of anterior low septal deflection. Gradually one side of the nose becomes more blocked, then the depression presses on that lower lateral cartilage and pushes it outward, the nasal tip comes nearer (relatively) to the upper lip and is pulled to one side. At the same time a low nasal hump becomes noticeable, then prominent; not the usual hump that is made up of a combination of bone and cartilage, but a purely cartilaginous one, produced mainly by upper lateral cartilages and the protruding quadrangular cartilage; a twist on the columella is also noted.

These cases come to us in the early stages. We advise a watchful waiting policy: Wait until full growth has occurred, *i.e.*, the accepted ages of 17 or 18 years, but by that time the nasal deformity is complete. A submucous resection may correct the breathing but not the deformity. I will not suggest what these cases need, except that we are at fault and research work is necessary. It is not to be forgotten that in addition there are cases of nasal deformity due to disease, as atrophic rhinitis, syphilis, tuberculosis, malignancy, etc.

Anesthesia: In the last two decades, local anesthesia has to a great extent superseded general anesthesia, especially in nasal plastic surgery. Here local anesthesia is almost the rule, and correctly so. The method most in vogue is infiltration anesthesia. Block anesthesia is, however, coming more into use and in my hands gives poorer anesthesia but less swelling of the operative fields; and so, because of the lessened swelling is an aid to more accurate results. If there is any field in which accuracy is demanded, nasal plastic surgery is that field. The smallest ridge, deflection, depression, or irregularity left, will, when healing has taken place, be noticed and even exaggerated

because all these structures are directly under the skin and so are quickly noticed. For nasal plastic surgery we inject both infraorbital nerves, and 20 per cent cocain applied to each sphenopalatine ganglion (one application). An extra application of 5 per cent cocain is added to the septal mucosa; also infiltration into the columella, especially the base. The patient is usually less apprehensive if a 6 gr. ampule of amytal is given one-half hour before operating. Therefore, a combination of block anesthesia with a small amount of infiltration anesthesia and topical anesthesia gives the best results, with slight tissue edema.

The question of possible complications is one that frequently bothers those not doing this work. Those who do it will tell

of but few and these usually amount to very little. As there are not many reports of these complications in the literature, I will give some of mine, and a few that I encountered in patients treated by other rhinologists: One case developed ether pneumonia, another had a local infection, followed by the extrusion of the inserted cartilaginous transplants, and its expulsion; a third had a similar occurrence with an ivory transplant. In both these last cases I inserted ivory several weeks later, and it has remained intact since that time. One peculiar complication occurred, that is, a hypertrophy of the subcutaneous tissue on the entire nose. Its cause I have never been

able definitely to account for, although excessive periosteal destruction or irritation may account for it. I tried heat, diathermy, massage, with no improvement, and the patient was lost track of. Another operator's case developed a septal perforation. At one of the meetings in New York a case of narrowing of the nasal vestibule, due to the use of the Joseph punch, was shown (the punch is being used less and less because accurate use of the scissors is giving better end-results). One surgeon showed me a case of gangrene of the tip due to incorrect dissection of the lower lateral cartilage. I think it was Joseph Beck who once cautioned against separation of the skin and periosteum above the nasofrontal suture and reported one or more cases of osteomyelitis of the frontal bone and

death. Occasionally cases of epiphora are encountered; sometimes patients complain of postoperative dryness; sometimes, even in the hands of the most careful operators, noses are produced that show lack of expression, some necessary skin motility being lost. This, I believe, is due to interference with the fine nasal muscles. These are all inserted in the nasal integument: the pypramidalis nasi, compressor narium, dilator narium and the levator labii superioris allequae nasi. Careful subperiosteal work is probably very important in avoiding injury to these delicate muscles. One can see that not all cases end perfectly to both patient and operator. The patients are

not too hard to please, as in the vast majority of cases results obtained are satisfactory. Frequently the patient is much more satisfied than I am with the result. Sometimes an almost perfect end-result will not satisfy them, but this is very rare.

The best rules to avoid complications are careful, slow operating, and opening up all pockets and sutures as soon as the slightest sign of infection is noted.

Operative Technique: There cannot be a rule of thumb in these corrective procedures. I am only outlining the general method of the procedures as practiced in this field and adding a few of the newer thoughts.

Time will not permit me to go into the subject of corrective nasal surgery by various flaps, whether from the forehead, cheek, postauricular or from some more distant point, except to state that the forehead, cheek, and postauricular areas seem the most suitable for skin matching purposes. Remember, in matching the skin of the nose or face, to use fine, small needles, fine silk, perfect co-adaption of suture line and, whenever possible, subcuticular stitching is best.

First, to correct cases that are overgrown, in other words need reducing in size, such as the long nose, the hump nose, the broad nose, the dependent tip, etc., the essential procedure is here almost the same as when first advocated by Joseph, except in one main differential: Joseph advised making a large free dissection of the skin over the entire nose from the nasofrontal junction to the nasal tip, from one maxillary eminence to another. The better procedure is to make a small dissection from the anterior edge of the nasal process of the superior maxilla to the anterior edge of the opposite nasal process, and in this pocket saw and cut through the hump. A second pocket is made subperiosteally, at the edge of the pyriform fossa to just in front of the corresponding eye, and sawing through the nasal process. Repeat this on opposite side; then fracture both processes towards each other, thus narrowing the nose. Proper fracture of the nasal processes from the maxillary bones and fracture of both nasal processes

and remaining nasal bones from the frontal bones will make the postoperative use of Joseph clamps unnecessary; and if you have to use the Joseph clamp, my experience is that the work was not properly finished and the result will not be good enough. The nose is shortened by removing a triangular wedge of the quadrilateral cartilage and mucosa, base anteriorly, and the proper suturing, whether orthopedic or mattress, as may be needed. The nasal tip is reduced in size by removing subcutaneously a triangular piece of the lower lateral cartilage, of such size as may be needed. These pieces should be saved, sewed together by catgut and if any depression is noted

(as the orthopedic stitch lifts the columella forward), it can be placed in that depression, thus giving a better finished result. The proper glabellar curve is attained by proper fracturing of the nasofrontal junction, either by use of a chisel, or if not much depression is needed, a special glabellar rasp may be used. The nose that shows an all around enlargement, *i.e.*, is simply too long, too broad or too high, is reduced as follows: All the usual skin elevation followed by removing triangular wedges from each nasal process and loosening up the frontonasal joint, and the proper orthopedic suture (depending upon the need) between the quadrangular and columnar cartilage. Cases may be met where both a poor appearance and even obstruction to breathing are due to hypertrophies or displacements of the upper or lower lateral cartilages. These are corrected by the usual skin dissection plus special resection of the guilty cartilage or cartilages and their partial removal or replacement, as indicated.

Rhinophyma is an especially ugly nasal hypertrophy. In correcting this condition one should note that in spite of the unsightly appearance, it is purely a skin affliction, the underlying bones, cartilages and nasal mucosa being normal. Electrocoagulation, X-ray or radium should be avoided in these cases, thus eliminating the dangerous necrosis that may result from these remedies. Undermine the skin, make various simple flaps; most of the diseased skin can be removed; use fine suturing (which will in a short time be barely visible). With this technique a good result is almost always obtained.

Twists of the nose require careful study as to the pathology involved, and are usually difficult to correct. The twisted nose (referring to first the bony or upper part) is usually narrowed on one side and broad on the other. This condition requires the removal of a triangular wedge of the nasal process on the wide side, with fracturing of both nasal processes, making the nose very movable and placing it in a central position.

Twists of the lower or cartilaginous portion I find still more difficult. Joseph advises a special operation, with special sutures, pulley, etc., which I have seen tried and found wanting. This led me to carefully study these particular twists and in the *Archives of Laryngology*, October, 1928, I advised my own operative procedure, which is as follows:

1. Separate the skin of the nose from the tip to just above the pyriform fossa.

2. Divide the columella from the septal cartilage.

3. Separate septal cartilage from its grooves in the vomer with or without lifting the mucosa on one side.

4. Cut each upper lateral cartilage at its attachment near the septum.

5. The septum should now be freely movable into the center; if not, separate the upper lateral cartilage from its pyriform fossa connection with an angulated knife like the Watson tonsil knife.

6. Remove a piece from that upper lateral cartilage which was hypertrophied.

7. The lower laterals, if found abnormal, may have to be corrected.

8. Proper suturing of the septal cartilage to columella; no other sutures are necessary.

9. Regular postoperative nasal plastic dressing for two days.

Notice how important it is to actually visualize the cartilages of the nose and their abnormality, if present.

How is the saddle nose corrected? A transplant is inserted by most operators, but others, noting that the noses are also usually broad in addition to the depression, go further and narrow the nose somewhat and then insert a transplant. This is the latest procedure in these cases and the results are much better than a simple transplant. The procedure is to saw through the nasal bones and then, lower down, saw through the nasal processes of the superior maxilla. These structures are then fractured over towards each other and also from the frontal bones. This will narrow and also lift up the entire nose. If this is insufficient, desired transplant should be added. The transplant, when cartilaginous, is from some part of the patient's nose or from the back of the patient's auricle; or, if a large amount is necessary, from the costal cartilage (this last is rarely necessary). Ivory is a very good substitute for cartilage and often is preferable. Transplants are inserted endonasally and thus far I have had very little trouble. Sometimes all that is necessary is to remove the hump that is frequently present above the depression, narrow the base of the nose, then place the removed hump downward into the depression.

It is to be noted that a thorough intranasal examination should be made before performing a plastic operation. Do not operate when a sinus infection is present, especially an acute one. A very high septal deflection may prevent the possibility of correct approximation of the external nasal structures and therefore that may have to be corrected first. It is not advisable to perform a submucous and a plastic at the time. A negative Wassermann should be obtained. Rule out hemophilia, tuberculosis, and recent furunculosis.

In conclusion, let me again point out that when a plastic surgeon looks at a nose, he sees and visualizes the underlying structures, noting which cartilaginous or bony structures are involved and makes the necessary corrective plans, according to the needs of each individual case.

2009 Pine Street.

THE SEWALL SPHENOID SINUS OPERATION, MODIFIED.

DR. WALTER D. CHASE, Bethlehem, Pa.

The contributions of Edward Cecil Sewall on questions involving the nasal accessory sinuses have been of so very high an order that suggestions to improve them must be offered with hesitation. However, in using his sinus operation, I have been so helped by some minor changes that I herewith present them.

Dr. Sewall has shown the advantage of working through a "posterior resection" of the nasal septum in taking down the front wall of one or both sphenoid sinuses and removing a part of the floor, as well as the sinus septum. This procedure has brought success to him in the treatment of a condition which has baffled all of us heretofore.

Frequently, in doing this posterior resection, the sinus would be entered when the rostrum came away and it was then seen how easy it is to do much of the work through the inter-septal space. However, the presence of the remaining, front, portion of the septum made manipulation with instruments difficult sometimes. I determined, therefore, to do complete submucous resection, whether needed or not, to facilitate instrumentation. This afforded such additional room that the operation was made tremendously easier.

I then discovered another advantage, namely, that one finds which of the sphenoids is the larger, when they are asymmetrical, as is so often the case. This enables one to determine which one has the lower floor and it is thus possible to make the drainage-connection with the corresponding side of the nose. Ferris Smith's experience in one case makes it advisable not to interrupt the arterial supply by ligating both sphenopalatine vessels, he having had gangrene of septum in one case when both arteries were ligated. Sewall has shown that drainage into one side of the nose is adequate. This drainage,

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Dec. 21, 1935.

however, should be at the most dependent site, that is, on the side of the larger (and lower) sphenoid. As I have stated, this fact is ascertained when one looks into the sphenoids which have been opened through the space between the septal flaps.

Since it is known that a sinus septum does not re-form if it is taken down flush with the floor or is covered with mucosa at its base, using a mucosal flap over the threshold of the sphenoid space at the close of the operation should give added assurance of a successful operation, since we all know how prone is the sphenoid front wall to regeneration, locking in the sphenoid space and keeping up infection. I determined, therefore, that use of a flap is desirable. However, the pre-sphenoid mucosa retracts and usually is found insufficient to reach up over the sphenoid threshold. I thought, therefore, that one could borrow mucosa from the posterior portion of the nasal septum, this affording a large enough flap to reach up into the space, covering the margin and part of the posterior wall. Having found the flap certain to keep patent the "window" in Caldwell-Luc antrum operation, provided the opening is made large enough, I reasoned that the use of a flap for sphenoid is equally desirable.

In using this large flap, I found little or no tendency for bleeding of the sphenopalatine vessels, this relieving me of the tedious work of ligating this vessel. Evidently, the natural retraction of flap allows the vessel partially to collapse; this, with the dressing I use, making for no hemorrhage. Since ligation folds that part of the flap, it prevents its reaching so far and lying so smoothly as when not ligated.

This modification of the Sewall operation, therefore, seems to afford four advantages: maximum room for instrumentation, opportunity to determine which side has the lower sphenoid floor before making the drainage-communication with the desirable side of nose, maximum-sized mucosal flap and no necessity for ligating the artery.

Procedure: Do complete submucous resection. Then continue the elevation over the sphenoids, working outward as far laterally as possible. Between the flaps, remove the rostrum and enter the sphenoids with Sluder hook. Bite out front walls with Hajek forceps. With Sewall and Ferris Smith forceps, remove the sphenoid septum and as much of the floor as

necessary. On the side of the sinus with lower floor, make the mucosal incision for drainage of sphenoid space. The incision is made with the No. 11 Bard-Parker blade, starting 2 cm. in front of sphenoid, on a level with sphenoid osteum, the incision passing back to face of sphenoid, then outward to lateral wall. Returning to the original starting place, incise downward and backward to the lower margin of posterior border of vomer. This flap is elevated, with the presphenoid mucosa, as much more as necessary, and turned down and outward. Then, working through that side of the nose, remove any additional bone from the sphenoid floor that is necessary. I always remove the lining from the sinus, elevating it and pulling it away instead of curetting (scrubbing with gauze is safer than curetting). The mucosal flap is then turned up over the margin, smoothed out and a stuffed glove-finger passed back through the nose into the sphenoid space. Vaselined iodoform gauze is lightly packed under this glove-finger and also into the opposite side of nose. The next day all dressings are removed.

For a few days the flap may be swollen. It lies in place, however, and, from it, mucosa grows over the whole sphenoid area, covering a gently sloping wall without any cupping of front and no granulations form in it. There is an occasional adhesion found in that area but it is snipped with Grunwald forceps. Any tendency for granulations to form at the site of the borrowed mucosa is readily controlled by silver nitrate.

Until adopting the Sewall technique, especially with this modification, my sphenoid operations usually gave me disappointment. I now approach them with confidence. Under local anesthesia, as Sewall advocates, sinus surgery has undergone a great change for the better. I hope all rhinologists who now use general anesthesia will try the Sewall procedure.

230 East Broad Street.

PERMANENT DRAINAGE FOR FRONTAL SINUSITIS.

DR. H. H. AMSDEN, Concord, N. H.

In order to insure success in the surgical treatment of chronic frontal sinusitis it is necessary to make a permanent opening between the sinus and the nose; this is often most difficult in any type of operation.

The following cases are reported briefly, not with an idea of advocating this treatment as a routine measure but as examples of clinical results secured by this method.

1. H. J., Aet. 38. Had had recurrent attacks of right frontal sinusitis for which several intranasal operations had been performed. He refused to have a radical external operation so an intranasal rasp drainage was done and an Ingal's solid gold tube inserted, with the intention of removing it in a few weeks. After leaving the hospital he disappeared for six months and then returned with the tube still in place. He had had almost complete relief from his symptoms and refused to have the tube removed. After five years there is no recurrence.

2. C. C., Aet. 32. This young man had a similar history; a rasp drainage was done, a tube inserted and two years after the operation there is no recurrence of symptoms.

3. Aet. 35. This young woman had had chronic pansinusitis since childhood, for which various operations had been performed including a radical on the left frontal, which failed to relieve her symptoms. A similar procedure was employed and now, two years after inserting the tube, she is symptom free so far as the left frontal is concerned.

What the ultimate fate of the tubes may be is problematical, but as gold is noncorroding and nonirritating there seems to be no reason for their causing any trouble.

5 South State Street.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Jan. 15, 1936.

BILATERAL BLINDNESS DUE TO AFFECTION OF THE POSTERIOR ACCESSORY SINUSES.

DR. JOHN J. RAINEY, Troy, N. Y.

In the face of hardly perceptible affections of the posterior ethmoidal labyrinth and the sphenoid, the proof of the rhinologic origin of optic neuritis is poorly founded.[1] This is Hajek's belief and that also of many other eminent rhinologists the world over.

The claims made by rhinologists that resection of the middle turbinate or removal of polypi, or even cocainization of the middle turbinate, corrects disturbances of vision undoubtedly have led many in our profession to look upon these claims as based more on fantasy than fact.

Too frequently nasal operation has been advised when other sources of toxic irritation to the optic nerve, tobacco, alcohol multiple sclerosis, syphilis, teeth, tonsils, the gall bladder, the prostate — have passed unconsidered.[2]

Often optic neuritis heals spontaneously, but there comes a time when the rhinologist with the co-operation of the ophthalmologist must decide whether to depend upon Nature for a spontaneous cure or to open the ethmoids and sphenoids to relieve congestion and prevent subsequent permanent blindness.

I believe the patient whose history is presented would have remained blind without operative interference.

History: Arthur W., age 28 years, an electrical engineer, and married. He has had frequent colds, and a year ago came to me with an acute attack of frontal sinusitis of the left side. He was treated conservatively and in one week was free of symptoms.

Early in January of the present year he developed lymphadenitis in the left axilla. This persisted for several weeks. A week before he developed adenitis he had scraped his finger on an emery wheel and at the same time began making leaden toys for his boy.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Nov. 4, 1935.

The patient came to me Feb. 15 of this year. His vision was decidedly diminished; he had a slight headache and the turbinates were somewhat congested.

Roentgenologic studies of the sinuses and teeth revealed nothing of importance.

His hemoglobin was 82 per cent; leukocytes, 9,200; basophilic stippling not found; Wassermann negative.

Because lead poisoning was considered a cause of his optic neuritis, a qualitative chemical examination of the urine was made. The report was negative.

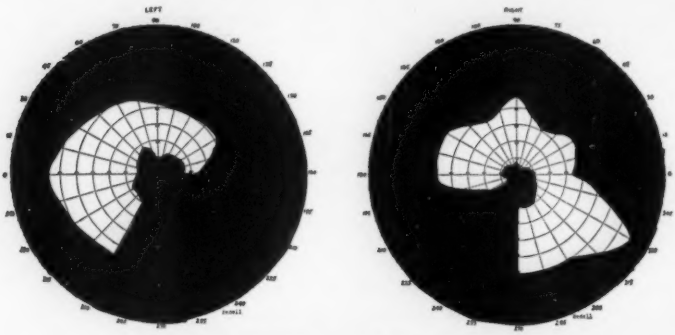

Fig. 1. Perimeter record chart left eye.
Fig. 2. Perimeter record chart right eye.

At the Troy Hospital, Feb. 20, I opened the ethmoid and sphenoid sinuses of both sides. The mucosa was congested but there was no evidence of serum or pus. There was a marked deviation of the cartilaginous septum to the right and with the Killian speculum it was held near the center line. The middle turbinates were left intact and there was no postoperative treatment.

The patient followed the clinical course of his disease very carefully and evaluated critically the results of the operation.

The first indication of impaired vision came on Sunday, Feb. 10, 1935. This manifested itself as a slight fuzziness of small print when viewed with the left eye alone. It was confined to a comparatively small area directly in the line of vision. Thus he could look at a word in a line of type and fail to see it, while type on either side and above and below would be visible.

The patient did not become uneasy about this condition until Feb. 12, on which date he consulted an ophthalmologist. At this time the sight of the left eye was so impaired that about 30 per cent of the normal vision was cut off. There still persisted the rather circular blank spot directly in the center of the line of sight. This circular configuration remained more or less throughout. The line of demarcation between the visible and invisible was strikingly sharp and defined even up to the time when a mere fringe of visibility was left. The doctor stated that there was nothing visibly wrong with the left eye, but suggested that inasmuch as the right eye would now be overburdened, he should get a glass for it.

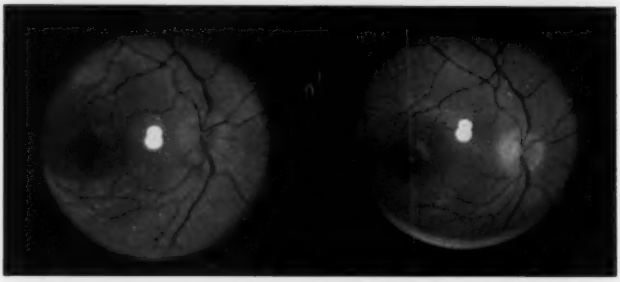

Fig. 3. Right eye (Feb. 20, 1935): Blurred outline of the swollen nerve head, full veins. Vision 4/200.

Fig. 4. Right eye (May 18, 1935): Vision 20/15. Disk flat, margins clear. Vessels negative.

The left eye continued to grow worse for the next two days and then he thought he noticed an impairment in the right. He returned to the oculist on Friday, Feb. 15, and after confirming the belief that the right eye was now noticeably defective, suggested that a rhinologist be consulted for a study of the sinuses.

I saw the patient for the first time that same afternoon, at which time the left middle turbinate was fractured. The following day the right middle turbinate was fractured. Over the week-end there was a noticeable improvement which lasted through the following Tuesday.

Wednesday, Feb. 20, however, the condition was much worse than it had been at any time previous. Dr. A. J. Bedell, of Albany, saw the patient the same day and confirmed the

diagnosis of blindness probably due to sinusitis and it was decided to open the posterior sinuses the next day.

The afternoon before the operation the patient sat in a motor car and the brightly shining sun was absolutely invisible. Aside from its warmth he had no indication of its being there. About 36 hours after operation the electric light in the room became noticeable; 48 hours later natural daylight was uncomfortably bright. Improvement was steady from this time on and the patient left the Troy Hospital one week after entering it. By May 1 his vision was as good as at any time previous.

The left eye, the first to show signs of trouble, was also the first to recover. It was approximately a week ahead of the right eye. He returned to work on March 13.

Dr. A. J. Bedell has furnished me with clinical notes and photographs, as follows:

Mr. A. W.

Examined on Feb. 20, 1935, vision of the right eye 4/200. Pupil 3.5 mm. regular, reacting slowly to light and accommodation. The media was clear, the disk elevated about 1 diopter with many fine, overlying vascular vessels.

Left eye vision 1/200, similar in appearance to the right, the elevation of the disk was slightly less.

The field of vision showed a marked defect.

On March 5, 1935, vision of the right eye remained 4/200. The left improved to 20/50.

When last examined on May 18, 1935, the right eye vision was 20/15, Jaeger 1. The disk was flat, fundus negative and field of vision completely restored.

Left eye vision 20/15, Jaeger 1. Fundus normal.

As the changes were similar in both eyes, the photographs for reproduction are those of the right eye before and after and I am sure that inspection of these will demonstrate the improvement in the fundus.

CONCLUSIONS.

It is possible that this patient would have recovered his sight without operation.

The condition, however, was rapidly growing worse and it was our opinion that operative interference was necessary to save the patient's vision.

As a rule patients with blindness due to sinus disease are first seen by the general practitioner and his prompt co-opera-

tion with the ophthalmologist and the rhinologist may be the means of saving their sight.

BIBLIOGRAPHY.

1. HAJEK: Nasal Accessory Sinuses. Vol. 11, p. 592, 1926 (Mosby).

2. FENTON: The Present Status of the Intranasal Operations for the Relief of Optic Nerve Involvement. *Trans. Ann. L., R. and O. Soc.*, p. 436, 1929.

52 Second Street.

COMING MEETINGS.

American Medical Association, Kansas City, May 11-15.

American Laryngological, Rhinological and Otological Society, Inc., Denver, May 18-20.

American Laryngological Association, Detroit, May 25-27.

American Bronchoscopic Society, Detroit, May 27.

American Otological Society, Inc., Detroit, May 28-29.

AUDITORY FUNCTION STUDIES IN AN UNSELECTED GROUP OF PUPILS AT THE CLARKE SCHOOL FOR THE DEAF.

III. RELATION BETWEEN HEARING ACUITY AND VESTIBULAR FUNCTION.*†

DR. RUTH P. GUILDER and LOUISE A. HOPKINS, B.A.,
Northampton, Mass.

In the two previous papers on auditory function, we have discussed, first, the general trend[1] of hearing acuity, by air and bone conduction, in an unselected group of pupils in a school for the deaf, and, second, classification[2] of audiograms according to type and level of graph by air conduction in such a group. While in a school for the deaf we are primarily interested in the study of hearing acuity and function of the auditory apparatus, it is essential that we should have some knowledge concerning equilibrium and function of the vestibular apparatus so that we may have as complete a picture as possible of the condition of the entire labyrinth and of both branches of the VIIIth nerve.

As a first step in this direction, the results of the rotation test have been tabulated and distribution curves established for the entire deaf group of 100 pupils included in this series of investigations, and for a normal group of approximately the same age distribution. The findings for the deaf group have been analyzed according to cause of deafness and according to type and level of graph by air conduction.

In Chart 1 and in Table I, the duration of postrotatory horizontal nystagmus in seconds for the normal group has been compared with that for the entire deaf group, the mean for the normal group being 19.6 seconds and for the entire deaf group, 9.95 seconds. There was a fairly wide range of variability in each group as to both the duration and the intensity of the postrotatory nystagmus. Statistics show some variation

*Read by invitation before the Annual Meeting of the American Otological Society at Toronto, May 29, 1935.

†From the Research Department at the Clarke School for the Deaf.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Sept. 20, 1935.

as to the physiological duration of postrotatory horizontal nystagmus in normal adults: Bárány[3] gives the mean duration as 20 to 25 seconds; Jones[4] as 24 seconds; while Malan[5], as the result of an examination of 11,000 normal subjects at the Turin Institute, gives a duration of less than 15 seconds

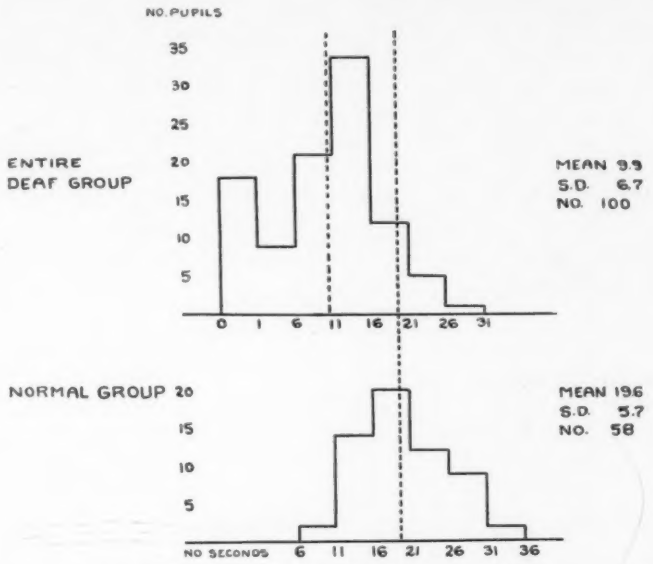

Chart 1. Distribution curves of duration of horizontal nystagmus after rotation to the right for normal group and entire deaf group.

	After rotation to right				After rotation to left			
	Mean	Min.	Max.	S.D.	Mean	Min.	Max.	S.D.
Normal Group	19.6	9	34	5.7	19.1	8	33	5.8
Deaf Group	9.95	0	26	6.7	10.3	0	26	6.9

Table I. Duration of postrotatory nystagmus in seconds, including the mean, minimum and maximum duration and the standard deviation, for the normal group and the entire deaf group.

in 9.61 per cent, of 15 to 30 seconds in 83.27 per cent, and of more than 30 seconds in 7.12 per cent. At the present time it would seem difficult to say just where the dividing line is between a normal and a diminished reaction, and just how much below normal we should consider the mean for the entire

deaf group. It is interesting to note that the normal group show a range of nine to 34 seconds, and the deaf group a range of zero to 26 seconds (see Table I).

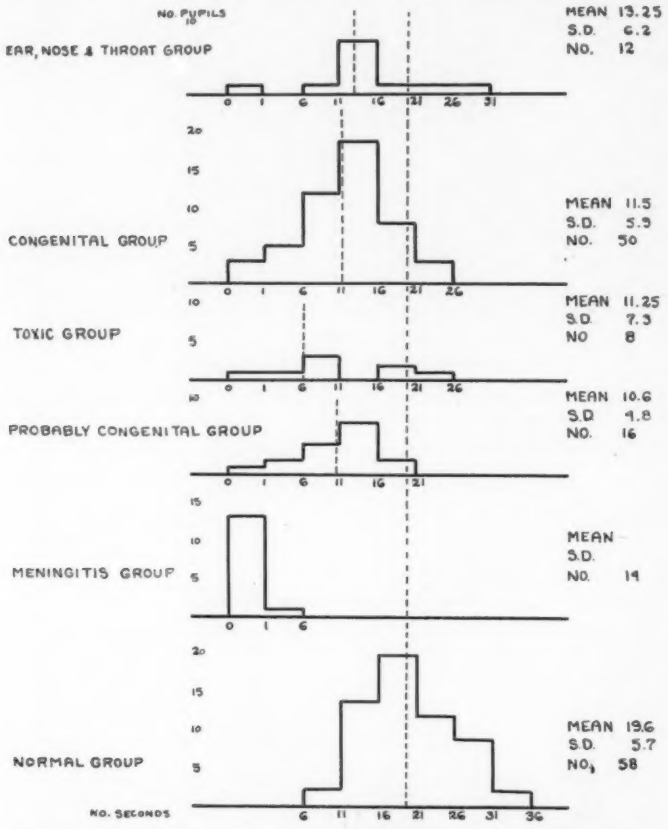

Chart 2. Distribution curves of duration of horizontal nystagmus after rotation to the right for normal group and principal etiological groups.

From the standpoint of cause of deafness, we have found that the mean duration of postrotatory nystagmus for the ear, nose and throat group is nearest normal, being 13.25 seconds; the means for the congenital and probably congenital groups follow closely and are 11.5 and 10.6 seconds respectively, and

that for the toxic group is 11.25 seconds; while the majority in the meningitis group give no vestibular response (see Chart 2).

The meningitis group is the most homogeneous from the standpoint of vestibular response as well as from that of hearing loss; the child deafened by cerebrospinal meningitis is almost invariably profoundly deaf and gives no vestibular response. It is quite apparent from Chart 2 and Table II that, except for the meningitis group, it is absolutely impossible to forecast the vestibular response from the cause of deafness. In all the other etiological groups, some individuals give no vestibular response, and some give a response for as long as 17 seconds in the toxic group, 20 in the proba-

	After rotation to right				After rotation to left			
Cause of Deafness	Mean	Min.	Max.	S.D.	Mean	Min.	Max.	S.D.
Congenital Group	11.5	0	25	5.9	12.6	0	25	5.7
Probably Congenital Group	10.6	0	20	4.8	11	0	22	5.5
Cerebrospinal Meningitis Group		0	2			0	2	
Ear, Nose and Throat Group	13.2	0	26	6.2	13.8	0	26	6
Toxic Group	11.2	0	17	7.3	9.9	0	21	5.9

Table II. Duration of postrotatory nystagmus in seconds, including the mean, minimum and maximum duration and the standard deviation, for the etiological groups.

bly congenital, 25 in the congenital, and 26 in the ear, nose and throat group. It should be borne in mind, therefore, that not only are the congenital groups and the ear, nose and throat group far from homogeneous from the standpoint of type and degree of hearing loss, but also that vestibular reaction in individuals in these groups may be normal, diminished or absent.

In Chart 3 and Table III, it would seem apparent that there can be no definite correlation between type of graph, as described in the second paper[2] in this series, and duration of postrotatory nystagmus, with the possible exception of Class III, the duration ranging from zero to 21 seconds in Class I, from zero to 26 seconds in Class II, and from zero to 25 seconds in Class IV. It is interesting to note that in Class III, the range is only seven to 23 seconds, and that the mean, 13.2

Classes according to type of graph	After rotation to right				After rotation to left			
	Mean	Min.	Max.	S.D.	Mean	Min.	Max.	S.D.
Class I.	11	0	21	6.7	11.4	0	22	5.8
Class II.	11.1	0	26	7.1	12	0	26	8.1
Class III.	13.2	7	23	3.8	13.7	8	23	4.1
Class IV.	8.2	0	25	6.7	8.5	0	25	6.8

Table III. Duration of postrotatory nystagmus in seconds, including the mean, minimum and maximum duration and the standard deviation, according to type of graph.

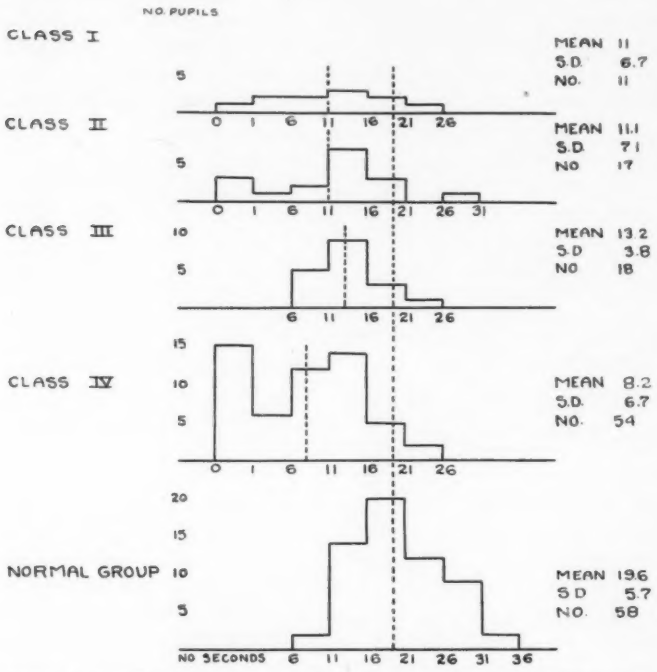

Chart 3. Distribution curves of duration of horizontal nystagmus after rotation to the right for Classes I, II, III and IV.

seconds, is nearer normal than that for any other class. The means for Classes I and II are almost identical, being 11 and 11.1 seconds respectively, and the mean for Class IV is the smallest, being 8.2 seconds. Nevertheless, there are individuals in Class IV giving reactions well within normal limits, and individuals in Class I giving no reaction.

In Chart 4 and Table IV, there appears to be an increasing deviation from the normal mean in Subdivisions A, B and C, the mean for Subdivisions A being 13.5 seconds, for Subdivisions B, 11.6 seconds, and for Subdivisions C, 7.9 seconds. These subdivisions are based on level of graph or amount of residual hearing, as described in the paper[2] referred to above, Subdivisions A constituting a hard-of-hearing group, Subdivi-

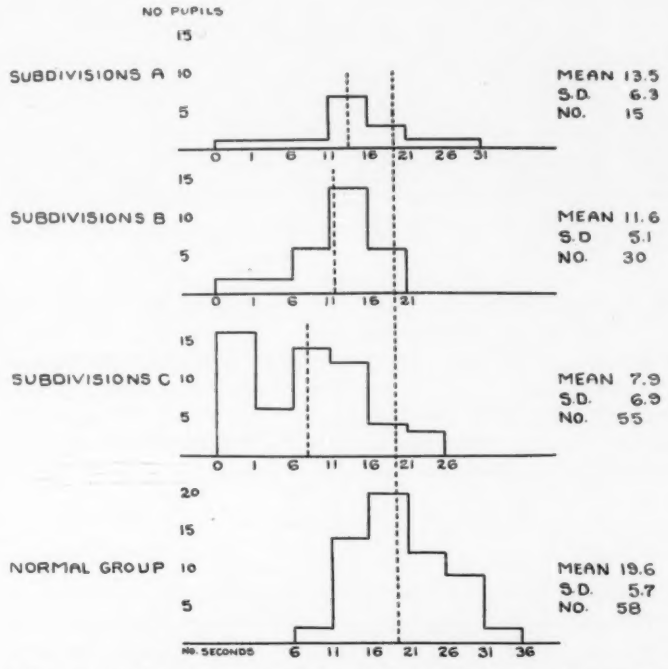

Chart 4. Distribution curves of duration of horizontal nystagmus after rotation to the right for Subdivisions A, B and C.

sions B a partially deaf group, and Subdivisions C a profoundly deaf group. While for individuals there is no positive correlation between level of graph or amount of residual hearing and the duration of postrotatory nystagmus, because in Subdivisions A there are individuals giving no reaction, and in Subdivisions C there are individuals giving a reaction for 25 seconds, yet in a group of 100 pupils, there is a steady, increas-

ing deviation from the normal mean, as one passes from Subdivisions A to Subdivisions C.

In addition to variations in the duration of the postrotatory nystagmus, other variations in the nature of the nystagmus have been observed in the individuals studied. There have been marked variations in the amplitude and rate of the rhythmic jerks, some being wide and slow, others being fine, rapid and almost imperceptible. In some instances, one type of move-

Subdivisions according to level of graph	After rotation to right				After rotation to left			
	Mean	Min.	Max.	S.D.	Mean	Min.	Max.	S.D.
Subdivisions A	13.5	0	26	6.3	14.7	0	26	6.7
Subdivisions B	11.6	0	20	5.1	12	0	22	4.7
Subdivisions C	7.9	0	25	6.9	8.3	0	25	7.1

Table IV. Duration of postrotatory nystagmus in seconds, including the mean, minimum and maximum duration and the standard deviation, according to level of graph.

ment has followed the other with rhythmic periodicity in the same individual. At some future time it is hoped that a graphic method for recording the eye movements may be introduced. For the present, however, the greater emphasis must be placed upon the study of hearing acuity in a school for the deaf, because of its important relation to progressive changes in educational methods for the deaf child.

CONCLUSIONS.

1. The average duration of postrotatory horizontal nystagmus for the group of 100 deaf pupils included in this series of investigations was 9.95 seconds, with a range from zero to 26 seconds, and for a normal group of approximately the same age distribution, 19.6 seconds, with a range from nine to 34 seconds.

2. With the exception of the meningitis group in which vestibular response is almost or completely absent, the etiological groups show a wide range of reaction.

3. While there is not a definite correlation for individual pupils between type or level of hearing curve and duration of postrotatory nystagmus, nevertheless, in the group of 100 pupils the average duration of the nystagmus diminishes as

one passes from Subdivisions A, the hard-of-hearing group, to Subdivisions C, the profoundly deaf group.

4. Marked variations in the amplitude and rate, as well as in the duration, of the rhythmic jerks were observed, the character of movement sometimes changing during a single observation. A graphic method for recording the character, as well as the duration, of the eye movements will be desirable for future studies.

BIBLIOGRAPHY.

1. GUILDER, RUTH P., and HOPKINS, LOUISE A.: Auditory Function Studies in an Unselected Group of Pupils at the Clarke School for the Deaf: I. General Survey of Hearing Acuity. THE LARYNGOSCOPE, Vol. XLVI:1, 46-63, Jan., 1936.

2. GUILDER, RUTH P., and HOPKINS, LOUISE A.: Auditory Function Studies in an Unselected Group of Pupils at the Clarke School for the Deaf: II. Classification According to Type and Level of Graph by Air Conduction. THE LARYNGOSCOPE, Vol. XLVI:2, 120-136, Feb., 1936.

3. BARANY, R.: Physiologie und Pathologie des Bogengangs-Apparetes beim Menschen. Deuticke, 1907.

4. JONES, I. H.: Equilibrium and Vertigo. Philadelphia, 1918.

5. MALAN, R.: Risultati della prova rotatoria in 11,006 sogetti normali. *Ann. di Laringol., Otol., Rinol., Faringol.*, fasc. 2, 1926.

Clarke School for the Deaf.

THROMBOPHLEBITIS OF THE INTERNAL JUGULAR VEIN FOLLOWING ACUTE TONSILLITIS. REPORT OF A CASE.*

DR. LOUIS CHARLES MENGER, Brooklyn.

Recent literature has shown that more attention is being paid to the internal jugular vein in septic conditions in which the throat or adjacent organs are involved. That infections in these regions can be transmitted by way of the circulating fluids to the larger neck veins has been fairly well established. If the local process is one in which a unilateral swelling, such as a peritonsillar or parapharyngeal abscess, is present, accompanied by a septic temperature and recurring chills, with or without a positive blood culture, the diagnosis, after eliminating other causes for such a clinical picture, is usually made with a certain degree of confidence. However, the problem is not always so simple. Cases are on record in which there was a bilateral involvement with the above symptoms, making it no simple matter to decide which side one should operate on. And, again, I venture to state that many fatal cases, which never come to autopsy, presenting an unexplained involvement of the blood stream, have had an unrecognized throat infection, which for some reason has overcome the natural barriers to infection and eventually penetrated the intima of the small veins or venules, there setting up the beginning of what is to later be a more or less generalized sepsis in which the internal jugular vein plays no minor role, but for the want of more localizing symptoms, passes unrecognized. In the case about to be reported the history of a definite throat infection, which fortunately was unilateral, gave us material help in solving a problem that for a time caused the physicians, responsible for this patient, no end of uneasiness.

On Sept. 11 of this year, Mrs. L. M., age 36 years, was brought to the Bushwick Hospital by its ambulance, at 10:30 P.M., with the following history: Three weeks before admis-

*Read in part before the Otolaryngological Section of the Kings County Hospital Medical Society, Nov. 13, 1935.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Dec. 22, 1935.

sion she had eaten some soft shell crabs at Keyport, N. J.; shortly thereafter she developed an edema of the lips, face and neck and an urticarial eruption on various parts of her body; under home treatment this condition readily cleared up. About four days prior to admission she suddenly developed a severe sore throat and a high fever. She received medical attention by a relief physician, who prescribed for her and took a culture from her tonsils. Shortly after taking some of the medicine which he gave her, her temperature fell to 102° F. but later it rose to 106° F. Thereafter she continued to run a very high temperature and, noting this, her physician advised her removal to a hospital.

Upon admission to the hospital her temperature was 105° F., pulse 144, respirations 40. At this time her throat showed a diffuse congestion, the tonsils were of the embedded type, with slight hypertrophy. The left one had a streaky, yellowish exudate. There were no palpable neck glands and very little jugular tenderness was present.

Past History: Contained very little relevant to her present illness. During childhood she had an operation on her tonsils for their removal but examination showed that same had not been successful.

Clinical Course: The morning after admission her 4 A.M. temperature was 98° F., her pulse 90 and her respirations 22. At 8 A.M. her temperature rose to 104° F. At noon she had a distinct chill. At 4 P.M. her temperature came down to 99° F., rising again at 8 P.M. to 104° F. On this day, her second in the hospital, there appeared no definite findings other than the throat picture, a palpably enlarged spleen and a few spots on the abdominal skin, which the attending physicians interpreted as being somewhat similar to rose spots. Blood count at this time showed 3,710,000 R.B.C.; hemog., 70 per cent; 6300 W.B.C., of which 65 per cent were neutrophiles, 30 per cent lymphocytes and 5 per cent monocytes. The red cells showed a slight hypochromia. Widal test for typhoid and paratyphoid A and B was negative. Urine essentially negative.

On the next day, her third in the hospital, her temperature remained elevated continuously. Nothing new was found to throw any light on her ailment. The exudate disappeared from her left tonsil, leaving only a congestion in its place. The first

throat culture taken in the hospital was reported as follows: Gram-positive cocci, singly and in clusters and many yeast cells present. Blood culture, the first taken, was negative after 24 hours. Blood chemistry within normal range. At 4 P.M. on this day, she had a sensation of chilliness. Later in the day a Tobey-Ayer test was done, which gave but little information. It showed an elevated spinal pressure on the left, the affected side, when pressure was made on the left jugular, higher than when pressure was made over the opposite jugular. The spinal fluid examination showed it to be practically a normal fluid chemically, cytologically and bacteriologically. Widals were negative. Blood culture negative. Stool examination negative for typhoid or paratyphoid.

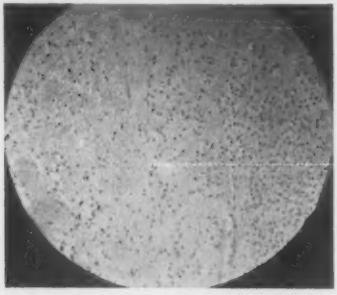

Fig. 1. Section shows portion of vessel wall and lumen containing polynuclear cells. Mural infiltration and congestion of vasa vasorum is also evident.

On the fourth day in the hospital patient stated that she felt much better in the morning but at 10:40 A.M. she again had a severe chill which lasted about an hour. After it her temperature went to 105° F. The throat picture was unchanged, although the left tonsil was, without question, decidedly more congested than the right, but same did not show any peritonsillar inflammation nor was there any swelling to be noticed in the retropharyngeal region. There was no swelling in the neck on either side and but little if any jugular tenderness present. Blood cultures still negative. Widals negative. Blood count not changed much. During the night patient appeared to be very uncomfortable.

On Sept. 15, the fifth day in the hospital, 4 A.M. temperature was 106° F.; 8 A.M., 103° F.; 4 P.M., 105.8° F. At noontime

she had another severe chill. In the morning she coughed and vomited a dark bloody material. Nothing new was to be seen in the throat. Progress notes state that over the entire left side of the chest the breath sounds were diminished but no rales or dullness detected. The spleen was still palpably enlarged and the enlargement seemed to be on the increase. Rather marked tenderness now began to appear over the left anterior region of the sternocleidomastoid muscle. Up to this time no improvement had been seen in this patient as the result of a conservative course of treatment. The medical service was unable to make a positive diagnosis. Chills and high fever were continuing. Ground was being lost and a chest complication seemed imminent. We decided that unless something radical was done soon, the patient would most likely go on to a general sepsis. By carefully rechecking the course of events we suspected that the most likely focus might be found in the left internal jugular vein. Therefore it was planned to be radical and resect the entire vessel.

The patient was removed to the operating room, after the proper preparation, and at 3 P.M. operated upon under local anesthesia using novocain solution 0.5 per cent. An incision was made over the anterior border of the sternocleidomastoid muscle from the tip of the mastoid to its sternal insertion. The entire anterior portion of this muscle was freed from its attachment and by retraction the entire vein and its branches were brought into view. The facial branch was definitely swollen, standing out very plainly in a reddened and thickened condition and almost the calibre of a small lead pencil. The entire jugular, which incidentally was of a large size, was of a greenish-gray color, and absolutely collapsed and ribbon shaped. No pulsations could be felt. One small lymph gland about the size of a coffee bean was found at the junction of the jugular and the facial veins. It was brownish-red in color. No other glands were found. The pharyngomaxillary and the submaxillary spaces were entered but no pus or other inflammatory material found. After tying the facial as high up as possible with two ligatures and incising between them, a definite black clot shoved out of the distal ligated end of the same. The internal jugular, with the facial attached, was carefully dissected free from its fibrous attachment throughout its entire course from the upper angle of the wound almost to the subclavian, all visible branches being included in the

dissection. After satisfactory ligation the entire vein was removed. The muscle was then sutured in place and a rubber tissue drain placed under it for about three inches from the bottom of the wound upward. The skin was closed with Michel clips throughout the length of the incision, leaving about one-half inch open of the lower angle for drainage.

Her temperature, after her return to her bed in the ward, was 105.8° F. and her pulse 100. She reacted to her operation very quietly, making no fuss and only occasionally complaining of pain in the operative region.

On the next day her temperature went down to 97.4° F. in the morning and recorded 98.8° F. in the evening. The following day it rose to 100.4° F. and after that came down to near normal where it remained for the rest of her hospital stay.

She was discharged from the hospital on the thirteenth postoperative day.

The removed specimen was sent to the hospital laboratory for culture in an intact condition. Anerobic and aerobic cultures showed gram-positive cocci singly and in clusters. The pathologist's conclusion was staphlococcus albus. Macroscopic examination, after section, disclosed an organized clot present in the lumen. Microscopic sections showed hemorrhage, collection of polynuclear cells with dark staining nuclei, with a collection of fibrin which closely merged with the blood vessel wall. There were areas of beginning fibroplastic proliferation. Pathologist's diagnosis: Thrombus undergoing organization.

Her progress since leaving the hospital has been satisfactory. She developed a troublesome, productive cough for a time which a physical examination, including an X-ray of her chest, did not show to be serious and since then has come well under control.

202 Weirfield Street.

THE CARE OF CLEFT PALATE PATIENTS.*

DR. HUGH GIBSON BEATTY, Columbus, Ohio.

INTRODUCTION.

Experience in treating patients suffering from cleft palate makes it more and more evident that certain other matters are almost if not quite as important as surgery — important both in preserving the health of the child until operation and also in securing satisfactory functional results through surgery and through observation afterward. These matters are just as essential but not as often emphasized as some particular surgical technique.

No attempt will be made to evaluate the various methods of operation employed by different men except to illustrate some particular point. Such an attempt would be very presumptuous inasmuch as there have been and are so many men whose opinions and work along this line have been and are respected.

The opinions and suggestions to be offered in this discussion of the subject are based on the writer's own experiences in the treatment of 318 patients. Various types and extents of deformity require one or more operations; failures require subsequent correction. The number of operations in the series has been approximately 393.

Many of the patients have had a complicating cleft lip, but the correction of this deformity has not been included in the number of operations listed above. Including harelip cases, the total number of patients would be 343 and the operations would total 602.

In the following chart, the cases are classified with reference to the type and extent of deformity. While the total number is not as great as cited by many others, the relative occurrence of each type in this list is representative of the frequency of its presence in practice.

---

*Presented as a Candidate's Thesis to the American Laryngological, Rhinological and Otological Society, Toronto, June 5, 1935.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Oct. 18, 1935.

Type I: Complete cleft of alveolar process, hard and soft palate (132 cases): Unilateral: Right, 40 — 26.32 per cent; left, 70 — 46.05 per cent. Bilateral: 42 — 27.63 per cent.

Type II: Cleft of alveolar process only (23 cases): Unilateral: Right, 4— 17.39 per cent; left, 18 — 78.26 per cent. Bilateral: 1 — 4.35 per cent.

Type III: Cleft of hard and soft palate only (93 cases): Unilateral: Right, 0 — 0; left, 5 — 5.38 per cent. Bilateral: 88 — 94.62 per cent.

Type IV: Cleft of hard and soft palate (complicated by incomplete cleft of one side of hard palate): 34 — 10.7 per cent.

Type V: Cleft of soft palate only: 16 — 5.03 per cent.

Total: 318. Type I — 47.8 per cent; type II — 7.23 per cent; type III — 29.24 per cent; type IV — 10.7 per cent; type V — 5.03 per cent.

Many men have for years described in detail their technique so that anyone doing palate surgery has a large variety of methods from which to choose. The writer has taken from the various methods parts that seem to be the best adapted to his ability and that give at his hands the best results. As all surgeons do, he has made some modifications, but no individual type of operation is to be here described.

As Goethe said: "If I could give an account of all that I owe to great predecessors and contemporaries, there would be but small balance in my favor."

HISTORIOGRAPHY.

No attempt will be made to give a detailed historical review of the work since that has been done in such an exhaustive manner by Dorrance[1] in his recent work, "The Operative Story of Cleft Palate."

In his work, Dorrance says, "Rolando Capelluti, of the school of Serlane (XII century), has been mentioned by Velpeau and Tirifahy as having observed fissure of the palate. No treatment was suggested." The first mention by Dorrance[2] of an operation having been performed is "Robert reported in 1766 that le Mormier, of Rouen, had successfully closed a complete cleft

of the palate." An abstract of the description of the operation states, "M. le Mormier, a skillful dentist, succeeded in reuniting the borders of the cleft by first inserting several points of suture in order to keep them approximated and afterward abraded them with 'the actual cautery.' An inflammation supervened, terminated in suppuration, and was followed by reunion of the lips of the artificial wound. The child was perfectly cured."

Dorrance[2] also states that Eustachio-Eustachius in 1779 first mentioned the difficulties of deglutition and speech in congenital absence of the velum. Four years later (1783), Eustachio-Eustachius described his operation for suturing the velum, split for the removal of nasal polyps (after the method of Manne), and added that this method could be applied in cases of congenital split of the velum. This then seems, according to Dorrance, to have been the first description of a technique for closure of the cleft palate — in 1783.

From this time, the literature carries various descriptions of technique of operations for this deformity — and still does. The old methods of securing union by cautery, inflammation, and suppuration have long been discarded; indeed, many of the procedures advised today by various operators are not generally accepted by their more experienced colleagues.

The earlier writings are descriptions of various methods of "curing" harelip. This more noticeable deformity apparently was the first part of the deformity of harelip and cleft palate to interest physicians in making attempts at closure.

PREPARATION OF PATIENT.

The surgeon selected to do the operations should see the patient soon after birth to outline his surgical procedure and, together with a competent, alert, well trained pediatrician, direct the care of the infant up to and through the various operations necessary to correct the deformity.

We must remember that these patients are never an emergency surgically. Therefore, we must be as certain as possible that they are in every way fit for operation — more so than in general surgery — as the operation, when correctly and carefully done, is necessarily longer than any other done on infants. We should employ all known methods of arriving

at this conclusion. The pediatric advice together with the reports of the various laboratory examinations, X-ray and complete blood, are very important.

None of these patients die before operation as a result of the deformity. If they die, it is because of faulty or incorrect feeding methods or an improper formula or some intercurrent disease.

Without going into detail, the proper amount of the proper formula for the particular patient must be established before operation. If a breast-fed baby, it must be taught to take food from some form of feeder before operation. An infant improperly fed, dehydrated, and with an almost necessarily upset gastrointestinal tract is one of the poorest risks for operation we know of.

The alert attentive baby that will stop in the midst of his feeding to kick up his feet and laugh with you is usually being properly fed and getting on well.

The baby with a "thymus shadow," or any tendency toward visible lymphoid tissue hyperplasia (pharynx, etc.,) in excess of normal, causes a greater anxiety over the possible postoperative reaction than the ordinary child. These patients are given a more detailed study than usual. For some time before operation, they receive iodine medication (Lugol's, etc.,) or proportionate doses of thyroid extract; those with an "enlarged thymus shadow" are given several X-ray treatments, with the X-ray examination repeated before operation.

We have seen a number of patients of this type under the care of different pediatricians and their opinions differ on the subject. Fortunately, we have observed "severe reactions" more times than death. Whether or not we believe in "status lymphaticus" as an entity, we do believe there is some secondary reaction in the glandular system in these patients. The endocrinologist interested in thyroid and thymus dysfunction tells us it is a lack of iodine balance and the failure of the thyroid to exert its government or direction of the body functions.

To the operator who has seen a baby expire in from five to 12 hours after operation in spite of all that can be done, this anxiety is real, especially so after he has gone through

a careful preoperative routine of examination and pediatric preparation. Many of these babies look well and seem in good condition, but often after a slight operation, temperature, pulse and respiration seem to be running wild without a governing force, and terminating in either death or several days of severe reaction. Further knowledge of the cause of this severe reaction is greatly to be desired.

The following is a history and postmortem findings in such a case. Following closure of a cleft arch, the patient had been in the hospital for 17 weeks under observation and pediatric care and was pronounced in as good condition as possible and satisfactory for operation. Although we knew the child was not normal in some ways, no positive contraindication to operation was given, and the family wanted the operation carried out. The child died eight and one-half hours after operation.

Case Report: M. B., age 9 months.

Diagnosis: Right complete cleft of lip, alveolar process and hard and soft palate.

History: Thirteenth child of mother, age 47 years. First operation for repair of cleft of alveolar process at age of four and one-half months. Postoperative reaction following this operation was more severe than in the ordinary child. Respirations were irregular for the first two hours, temperature elevated from 102.8 (first hour) to 104 (fifth hour), but gradually subsided to 101.2 within 24 hours. At present (nine months) child does not sit up or hold up head, which is large. Weight, 14 pounds.

X-ray of Thymus: "No enlargement of thymus gland."

Laboratory Reports: Nose and throat cultures: Negative.

Urinalysis: Normal except occasionally slight alubumin. Blood count (48 hours before operation): Hemoglobin, 83 per cent; red blood cells, 5,520,000; leukocytes, 15,600; neutrophiles, 18 per cent; lymphocytes, 81 per cent; mononuclears, 1 per cent. Coagulation and bleeding time: Normal. Wassermann and Kahn: Negative.

Operation: Repair of complete cleft of lip, right side. *Anesthetic Time:* One hour, 25 minutes. *Operating Time:* One hour, 23 minutes.

Details of a lip operation are included here to illustrate a typical case which may react to any operation.

"During operation, child reacted badly to a light degree of ether and oxygen anesthesia. Respirations shallow and jerky at times."

At completion of operation, 150 cc. glucose given; patient's body seemed hot. Rectal temperature, taken on operating table, 108. Pulse, 176. Respiration, arhythmic. Patient was returned to room and given sponge bath and digalen.

Temperature before operation was 98. After operation, temperature ranged from 105.8, 30 minutes after operation, to 108, and was 107, 30 minutes before death, eight and one-half hours after operation.

Temperature for two weeks prior to operation had ranged from 99 to 100 without known cause, but had returned to normal.

The entire autopsy report is long and need not be repeated as a whole. The important parts of interest are: A large tumor in apical region of heart, which on section was primary rhabdomyoma; in the duodenum and the terminal portion of the ileum were closely set multiple areas of lymphoid hyperplasia; enlargement of the mesenteric glands, the largest measuring 12 x 7 mm.; congestion and edema of lungs but no pneumonia; thymus normal; brain sections normal.

These were the main points of interest in this case of general lymph adenopathy. We had a patient, not normal in a general way; variation in frequent blood counts and temperature range; yet with no outstanding contraindication for operation unless the blood picture would have been considered such.

The blood picture in this child was abnormal. There was a definite leukocytosis. The lymphocyte count was 30 per cent higher than the normal upper limit for this age, the neutrophiles 22 per cent lower, and the mononuclear count definitely depressed. This picture would indicate that further laboratory and clinical study should be made to definitely determine the cause for these abnormalities.

In accounting for high temperature deaths in babies soon after operation, we must not overlook two possibilities: First,

some interference with the normal action of the heat centers; second, reaction to the sudden injection of tissue proteins into the circulation. If the baby had a high protein sensitivity, there might be enough autogenous protein liberated by the normal amount of surgical trauma to produce the effect. If this is true, then a careful program of sensitization tests to food and bacteria should be carried out, and a careful history of any form of allergy in the parents sought.

It has been interesting to observe in our series that the patients having an "enlarged thymus shadow" and having had several X-ray treatments have not shown this postoperative reaction. Neither have they shown a visible tendency to hyperplasia of the lymphoid structure. This patient had a "normal thymus shadow," and the gland showed no significant changes on microscopic examination, but there was a generalized lymphoid hyperplasia.

Wiseman[4] has shown in experiment with chronic foreign protein injections that "the thymus does not take part in the general hyperplasia of the lymphatic tissue which results. Repeated parenteral injections by various routes in a series of 12 rabbits caused an increase of lymphocytes in the peripheral blood varying from 23 per cent to 139 per cent. It seems probable that the degree of response is conditioned upon the type of protein used. At autopsy the lymph nodes and spleen showed hyperplastic changes. The thymus did not participate in the hyperplasia."

This tends to disprove the long held idea that if there is an "enlarged thymus" there is likely to be more or less generalized and associated lymphoid hyperplasia. In speaking here of "enlarged thymus" and of the syndrome "status thymicolymphaticus," we are aware of the great diversity of opinion as to the existence of either as a pathologic entity even though the terms do occur in literature.

It appears that we must rule out allergy in these patients and we should have been warned by the reaction following the first operation that any subsequent surgery might be followed by a more severe reaction. In the first operation there was less raw area of tissue exposed than at the second, and less trauma. Had more extensive surgical work been done in the first place, a fatality might have resulted. Again the effect

of the first operation may have been to increase the previous sensitivity to a point where even a minor surgical procedure would then have been fatal.

One naturally wonders whether some of these cases may not logically belong in the same category with those of sudden postoperative high temperature deaths recently described by Connell,[5] who states: "An explanation based upon chemical, biochemical or metabatic disturbances seems much more probable than one depending upon microbic or bacterial infection." In his summary he says: "Rapid high temperature deaths follow operations upon other than the biliary tract, probably more frequently than is supposed. One would seem justified in suggesting that the fatal syndrome is perhaps not hepatic but extrahepatic with possibly an important cerebral factor."

Connell,[6] Eiss,[7] and Shearer[8] had previously discussed the specific relationship of hepatic surgery to postoperative hyperpyrexia.

EAR, NOSE AND THROAT COMPLICATIONS.

That this surgeon should be observant of the ear, nose, and throat, is evidenced by the frequent inflammatory involvement of these parts in this particular class of patients, especially prior to and during the surgical period.

The middle ear and maxillary sinus are often the seat of acute inflammations or infections. Especially is this so during the months of varying cold temperature and unsettled atmospheric conditions. We have frequently found, in a baby with excessive nasal discharge from the middle meatus, an unsuspected maxillary sinus involvement. This holds the infant back in a normal weight curve increase, causes intestinal disturbance as evidenced by abnormal stools and changes in the blood count. Of course, to close a palate cleft in the presence of this symptom complex is only to invite trouble, including infection of the raw surface of the palate.

In these patients with the oral and nasal cavities abnormally connected, often with both middle meati and respiratory fissures wide open to the oral cavity, the small percentage of ear and sinus disease is remarkable. Malnutrition, dehydration, improper feeding methods, etc., together with, of course, the acute exanthemata, seem to be the greater factors favoring infection of these parts.

The inhibitory action of the saliva and nasal secretion on bacterial growth must play a very important part in these patients who go through without infection. When we consider that if not closely watched, many of these babies put their hands, toys, "toes," clothing and various other things in their mouths, they must carry bacteria into the mouth and nasal cavity.

The usual procedures employed in the treatment of inflammation or infection of the ears and nose may of necessity have to be varied in these patients to secure satisfactory results. Even after a successful closure of the cleft and after the patient is grown, he often presents a problem in the endonasal treatment of affections of the ear and nose because of the intranasal deformity. Particularly is this so in patients developing sinus disease, or tubotympanic involvement, whether suppurative or hypertrophic.

No rhinologist sees many of these patients with complications in the course of his practice and after a few years most of them are lost to the original operator.

Infections of the ears and sinuses occurred in 7 per cent of the patients while they were under our observation. This does not include the frequent non-purulent reactions which may flare up and subside.

Acute tubotympanic congestion has been found in this series more frequently between the ages of 3 months and 2 years. Later on, while an acute inflammation can and does often occur, a chronic purulent otitis media or sinusitis or a hypertrophy with infection of the tonsils and adenoid more often is the complication at hand.

We realized some years ago the extreme importance of a rather detailed knowledge of the constant condition of these patients before operation. We found that the taking of certain tests at a certain time was a distinct advantage and in instances reduced the hospital days of the patient. To facilitate a more certain preparation for operation and to eliminate the possible omission of an important order, the following list of "standing orders" (with some subsequent changes) was adopted for the hospital several years ago. As in the case of all "standing orders," flexibility and variation for individual patients must be allowed and made.

CARE OF CLEFT LIP AND PALATE CASES.

(Should be read by resident and interne before seeing any case.) (Charge nurse should be thoroughly familiar with all of these orders.)

Preoperative: 1. Careful physical examination including ear, nose, and throat and a signed written report.

2. Interne to question family carefully as to recent illness or exposure to communicable disease or infection and family tendencies to disease; later charge nurse to question because family members may forget or refuse to tell the doctor of recent exposure to infectious disease, family tendencies towards such as a hemophilia and others that would contra-indicate operation.

3. No case will be operated with acute inflammation of upper or lower respiratory tract or ears. Patient may show signs after examination indicated in Sec. No. 1 has been made. (Symptoms may develop 12 hours after this examination.)

4. Laboratory — for all ages. Throat culture on admission, repeated 24 hours before the operation. Wassermann and Kahn tests; blood count (complete); hemoglobin; coagulation time; bleeding time; urinalysis. Report of *these* tests *to be on chart* with 24 hours after admission. Vaginal swabs on all females, taken by charge nurse. X-ray of thymus on all children 6 years of age and under, within 24 hours after admission.

5. Soda bicarbonate (or other alkali) q.s. P.R.N. 24 hours before operation to produce alkaline urine.

6. Skin tests for milk, eggs, and bacteria (on order).

7. No cathartics. Enema at 6 A. M. for patients, age 6 years or under, on day of operation. Enema night before operation *and* morning of operation for patients, age 6 years or older.

8. Push fluids — fruit juice (orange), according to age, up to 6 hours before operation. *Nothing after. Caution relatives not to feed or give fluids to patient.*

9. Patients, age 2 years and under — 200 cc. (or more, according to age) of normal saline intraperitoneally one hour before operation. This solution is to be made from triple distilled water.

10. Temperature one-half hour before operation—*important.*

11. Before sending to operating room, cleanse operative area and nostrils with boric acid swabs.

12. Proportionate dose (hypodermic) *of atropine one-half hour before operation.* (Be sure as possible of time of operation.)

13. Keep family from going to the operating room, if possible.

14. Send patient to operating room *warm* and well wrapped in a blanket, and *only* when anesthetic is to be started.

15. No infant operated: *a. Unless* on modified cow's milk diet (or mother's milk); *b. unless* normal stools; *c. unless* gaining weight — weigh daily; *d. if* regurgitating feedings; *e. unless* "seems good" to pediatric nurse.

Preoperative Iodine Therapy (on order by the surgeon): According to age, suitable form of iodine in maximum dosage from time of hospitalization.

Adults: Lugol — 10 to 15 drops a day.

Children: From 4 to 6 years of age: Iodide of iron or syrup of hydriodic acid (one-half to one teaspoon a day). If necessary — oridine (chocolate coated tablets.)

Babies: Syrup of hydriodic acid (10 to 15 drops a day).

CARE OF CLEFT LIP AND PALATE CASES.

Postoperative (for babies and children — special orders for adults): *1.* See that patient has dry clothing. May wrap in dry warm sheet and warm blanket and use hot water bottles. *Have a warm bed.* Do not chill patients in changing garments or wrappings.

2. Watch respiration; that is, see that patient gets easy free breathing. If necessary, call interne.

3. Put cuffs on arms.

4. See that freshly prepared 6 per cent solution of glucose is returned with patient from the operating room or ready when patient is returned from operating room. Have ready for glucose solution sterile bottle (2–4 oz.) (with sterile rubber-covered medicine dropper tip) contained in hot water container.

5. When patient reacts and can swallow, give glucose solution (warm) carefully, P.R.N., *ad lib.* to quiet and for 12 hours thereafter.

6. Feeding to be ordered by pediatrician and have orders *before* the operation.

7. If patient shows signs of shock or unnatural postoperative signs, *call interne and surgeon. Don't wait.*

8. If patient is not quieted by glucose and is unusually restless and crying, give codein by hypodermic (by interne's orders) for three doses. After that, the needed dose may be repeated every four hours if required. *Never give any narcotic until the effect of the anesthetic has passed off completely.*

We know that a patient may be rendered to some degrees unfit for operation by "over preparation," but since the above system has been used (10 years), there has been a marked decrease in postoperative reaction and fatalities. Our chief worry at present is with the type of patient mentioned above in which the severe temperature, pulse, and respiratory reaction unexpectedly occurs.

SURGERY.

The objective striven for in the surgical treatment of cleft palate is to secure union of the cleft borders in such a way that as nearly as possible normal function of the affected parts will result. To secure satisfactory function in the acts of deglutition, respiration and speech in some is difficult even when the operation is done at the proper age. The parts which are so important in the acts of swallowing and respiration should be very carefully handled during operation and accurately and correctly approximated, so far as is possible, to secure complete function. However, many cleft palate patients when they are older are more concerned about the speech element than either of the other functions of the palate. In other words, defective speech greatly influences the psychology of cleft palate patients. This psychological factor in these patients must not be overlooked, but the health and development of the individual should be our chief consideration. Straith[9] says, and he has many authors to substantiate his statement, "The psychological effects of congenital abnormalities begin to manifest themselves early in childhood."

We feel that too much stress cannot be made on the proper time for operation of the particular type of cleft at hand.

In our experience and observation of the work of others, surgery of the hard and soft palate, if begun before the proper age, usually results in partial or complete failure. Failure to secure primary union produces scar or loss of tissue so that the subsequent operation is difficult and the final restoration never so satisfactory as a successfully performed first operation. The over ambitious or inexperienced surgeon, by injudicious surgery, often permanently destroys a certain amount of function of these parts.

On the other hand, it is well known that surgery instituted several years after the proper age is of necessity more radical, and certainly cannot give the patient as good deglutitive, respiratory, or phonetic function as when done earlier, although it may, by some methods, secure a very good closure.

Failure to secure primary union in a satisfactory way is usually the result of ignoring certain facts which should be well known to the surgeon essaying to do this particular type of surgery. We say this because we so frequently demonstrated the truths that : *1.* One cannot successfully operate on the physically unfit; *2.* one cannot satisfactorily operate at the wrong age; *3.* one cannot succeed and ignore surgical principles; *4.* satisfactory results cannot be had with improper after-care.

Brophy[10] in his last book on "Cleft Lip and Palate" lists 15 different varieties of cleft palate. We have observed all types mentioned by him except No. 15 which is "Cleft only of the alveolar process anterior to the maxillae due to the non-development or absence of the premaxillae. Such cases are usually accompanied by cleft lip in the median line—inoperable." These types are rare, and many of the others only occasionally occur.

For the present purpose, it will be sufficient to classify all cases as one of two general types involving different surgical principles: *1.* Cleft of soft and hard palate; *2.* cleft of the alveolar process.

In dealing with clefts involving only the soft palate or extending into the hard palate to varying degrees, the entire cleft is closed at one operation.

In our experience, closure of these clefts between the ages of 12 to 18 months has given the most satisfactory results. No doubt if the cleft could be closed soon after birth and the united palate grows and develops with the growing baby, the ultimate function would be better, but for obvious reasons, we have not considered this plan. By the time the baby is 12 months old, we have a record of the general physical condition during this period and a good idea of fitness for operation. We have had ample time to study the renal and vascular systems. Blood studies give us much necessary information. The study of the endocrine system in infants presents a problem unless the endocrinopathy is one of extreme type. We feel, as before mentioned, that the baby with a disturbance of this function mild enough in form to escape our present day method examination, yet severe enough to manifest itself following surgery or other shock, is a very dangerous patient for operation.

At the fourteenth month the soft tissues of the hard palate have developed sufficient thickness to withstand careful manipulation without rupture. The blood supply is adequate to facilitate good union. The soft palate has developed into a real muscular structure of sufficient size to easily work with surgically. All these factors, in our experience, favor this age for operation on the soft and hard palate clefts.

The principle of the technique used is that of Brophy,[11] with some changes favorable to our way of operation.

If the cleft extends into the hard palate, the operation is begun by elevating the flaps of this structure first, sufficiently to allow easy approximation. The periosteum is included in the flap. The soft palate is then detached from the posterior border of the horizontal part of the palatine bones sufficiently to allow approximation. The borders of the entire cleft are then denuded of mucous membrane for suturing. The muscle tissue at the borders of the soft palate is then well exposed for approximation. At this stage, two No. 22 gauge silver wire stay sutures are introduced through the soft palate from the oral surface on one side and brought out through the opposite half of the structure, to be united on lead plates at the completion of the operation. These are only to oppose the action of the tensor palati muscle and prevent the soft palate suture line from opening under the strong contractions of this muscle.

They are not used to draw together the cleft borders, and the tension must be correct to prevent injury to the muscle.

The entire cleft border is then closed with horsehair sutures and the operation ended. Careful attention is given to the uvula, as parents invariably comment on a well or poorly formed uvula, rather than upon its usefulness in the structure of the new palate.

By using the small sized wire fastened over the lead plates to prevent cutting, there is little or no injury to the muscle. When the palate is not contracting, there is no tension on the muscle. By this means, we have not found it necessary to use lateral incisions or any form of detachment of the muscles from their lateral anchorage.

In reference to the treatment of clefts of the alveolar process, operators have divided themselves into two main groups, one advocating closure and wiring of the parts to secure union; the other doing no surgery on the arch but closing the lip over the cleft, depending on the pressure of the closed lip to approximate the bones without union.

In our practice, the alveolar cleft is closed between the second and third month of age and held in position by silver wire, the soft tissue closed with horsehair. At this age, the bones are flexible and are not fractured. The technique varies here with the problem at hand.

If the cleft is a bilateral complete one with protruding premaxillary bone and if the patient can be operated at the proper age Brophy's technique[12] or some modification of it is used. In a personal communication from Prof. W. L. Shearer, of Omaha, Neb., dated Aug. 27, 1934, he says, "I carry the Brophy operation through in its entirety in all cases where there is cleft of the alveolar arch." In older patients, the methods of Davis[13] and Shearer[14] have proven very satisfactory.

Bad results may follow the improper application of the technique described by the above mentioned experienced operators in their writing. The surgical principles and procedures described by them must be closely followed if results similar to theirs are to be obtained. It is a mistake sometimes made by those unfamiliar with this work to read a description of the operation and then to hope to accomplish the same results

without having even seen the originator demonstrate the technique.

In this method also, the careful placing of the wires and absence of too much tension is a most important step. We have never seen a troublesome hemorrhage or bone necrosis as a complication of this operation. We feel that a united arch is a part of an ideal restoration and more satisfactory later than one left ununited.

The patient with a cleft of the hard and soft palate who has been previously and unsuccessfully operated *always* presents a problem to the operator. The patient with an improperly treated or ununited alveolar arch presents later a problem to the orthodontist, and the deformity is a source of personal discomfort and disadvantage. It has been our observation that the permanent upper front teeth in patients with a cleft of the alveolar arch are nearly always irregular with or without operation. We have seen a number of adults who have had no operation; their upper anterior teeth invariably have been irregular or defective. It is supposed that the same factor which causes the cleft, whatever that may be, may have been the cause of the irregular dentition.

As is the effect when placed too far back, the premaxillary segment, if set too far forward, causes a very noticeable deformity in the way of a receding or protruding upper lip and improper occlusion of the upper and lower teeth. The permanent upper teeth are irregular and often defective in every case of double complete cleft. They are especially so if no operation is performed; they are somewhat irregular with any technique used, and can be made worse, of course, by the improper use of wires.

In reference to the proper occlusion between the upper and lower teeth, Dr. Clair L. Straith, of Detroit, Mich., in a personal communication of Aug. 18, 1934, says, "I have seen other cleft palates that have never had a Brophy operation and where the lower teeth occlude outside the uppers to give the same appearance that one sometimes sees in children who have been operated by the Brophy method.

Following is an arrangement of our cases showing the age at operation, type of cleft, and number of each operated and the mortality.

Age		Number of Cases Operated 318	Mortality Number of Cases Hard and Soft Palate	%	Alveolar Arch	%	Total Percentage
3 months	Arch	72					
to	Palate	2	0	0	2	2.77	2.72
6 months	Total	74					
6 months	Arch	23					
to	Palate	101	1	0.99	1	4.34	1.61
24 months	Total	124					
2 years	Arch	3					
to	Palate	43	2	4.65	0	0	4.35
6 years	Total	46					
6 years	Arch	10					
to	Palate	49	0	0	0	0	0
12 years	Total	59					
12 years	Arch	1					
to	Palate	14	1	7.14	0	0	6.66
37 years	Total	15					

Heredity, 15 per cent.
Ear and sinus infections, 7 per cent.
Other deformities, 4 per cent.

Our low mortality rate we attribute to a very painstaking preoperative examination and preparation.

After the death of a patient we have sometimes felt that it was a mistake to attempt the operation, but in each such case the operation was performed with the advice and approval of the pediatrician and other consultants.

SPEECH ELEMENT.

As before stated, the speech element concerns the patient more than the other functions of the palate after the self-conscious age is reached. Usually it is the main concern of the parents when the baby is first operated upon. We feel strongly that the palate cleft should be closed before or at the time of the onset of speech.

Hudson-Makuen[15] says, "The child begins to build up speech impressions and habits early in the second year, and the more serious forms of speech defects are those that are acquired during this formative period."

Russell[16] and many other authors[17,18,19] insist that the auditory patterns are established and even many speech sounds, such as *m, p, b, d, t,* the vowels, etc., are already well practiced before the middle of the first year.

As Wundt puts it: "Naturally all three steps pertain to speech development in its widest sense . . . first, crying sounds of vowel character, *ah, o, oo,* to the sixth week . . .; second, from the seventh week to the end of the first and even second year in even normal children articulated sounds without thought content . . . characterized by the rapidly developing number of sound articulations . . . especially in the seventh to eighth month . . . first the vowels, then the consonants . . .; third, thought content speech (P.R. 283-286)."

Most children with cleft palate, if operated upon early, begin to talk at the usual age; if not they may be retarded and will not make the attempt until later. Speech is learned through the auditory, visual, and kinesthetic senses. The child attempts to reproduce phonetically the auditory and visual impressions from the speech used around him. The normal child, by checking his phonetic output through these senses, in time learns to talk correctly. In other words, his audible results check with his speech impression and memory. This cannot be attained in the child with a defective peripheral speech organ.

When such a child checks his own imperfect attempts confusion results, and finally his faulty production is recorded in his speech center as his speech-directing mental pattern, which is, of course, incorrect; that is, he has incorrect speech impressions.

Hudson-Makuen[15] called this complex "cerebral impressions and peripheral habits." Once established, these impressions are difficult to break down.

Dorrance[20] says, "Patients with cleft palate are difficult individuals to teach new speech habits." These patients who have begun speech with a cleft palate have to be taught new speech like a new language so far as articulation is concerned.

Timbre pitch and intensity have to be regulated by correct breathing habits, as many of these patients, of necessity, waste much air in their attempts at speech. Exercises in correct breathing or use of the breath during speech must be employed.

This waste of air becomes a habit in complete clefts through failure to develop the three contact or stop points or positions which act as a resistance to the column of air during its passage through the peripheral speech organs. These points are: first, the dorsum of the tongue in contact with the soft palate and posterior pharyngeal wall; second, the tongue tip against the hard palate and teeth; third, the lips and teeth.

A soft palate which does not shut off the air column from the nasal cavity when it should disturbs certain speech sounds materially, such as *p*, *f*, *s*, *th*, etc., and the speech defect is called rhinolalia aperta.

Palatal adhesions restricting passage of the air, when it should not be restricted, as for *n*, *m*, and *ng*, cause a disturbed speech and voice similar to that heard from one who has a "cold in the head." This difficulty is called rhinolalia clausa.

Since the soft palate or velum palati is a very active and the only movable part of the palate, it is the most concerned in speech. Therefore, it is our duty as palate surgeons to be most considerate in our manipulation and treatment of this muscle during operative procedures. It is composed of an intricate set of muscles, each with a special function. If a child in whom these muscles are separated by a congenital cleft can have them properly approximated at an early enough age with the least possible scar tissue or injury to the muscle body or tendons, he will stand a chance of developing almost normal speech under and following proper speech training.

This structure should receive as careful surgical consideration as the iris in an eye operation if good phonetic results are considered, because, as the iris regulates the light in vision, so does the soft palate regulate the air flow into the nasal cavity during speech. One of the outstanding speech defects of cleft palate patients is the failure of this air regulation.

Surgical faults which impair action are: *1*. A short soft palate; *2*. an improperly aligned union; *3*. unnecessary scar tissue; *4*. injury to muscle attachment and nerves; *5*. adhesions; *6*. injury during removal of tonsils and adenoids.

The effect of a short palate is obvious. If the borders of the soft palate are not approximated evenly, that is, if one

segment is attached too high or "crimped" by badly placed sutures, the action of the palate will be impaired. Injury to the medial upper part of the superior constrictor during adenoid removal happens more often than is realized. In swallowing and in some speech production this part of the muscle contracts and forms a pad which meets the soft palate. A break in the continuity of this muscle impairs this function in proportion to the injury and secondary scar. The effect on speech is that of a short palate. Injury to the faucial pillars will shorten or stretch the palate and produce the same effect on speech and deglutition.

RESONANCE.

Resonance (Webster) is a prolongation or increase of sound due to the sympathetic vibrations of some body capable of moving in the proper period. Just as a series of small pulls at the right intervals will set a large bell to swinging, so resonance results from the repetition of small impulses which, when the bodies are "in tune," have a purely additive effect but otherwise tend to neutralize one another.

The idea has long been handed down that the nasal accessory sinuses aided in speech by adding "resonance" to the voice. Most of us have accepted this idea without question or investigation.

In securing resonance through the agency of air chambers, it is pointed out through experiment by Dr. G. Oscar Russell, director of the Speech and Voice Clinic at Ohio State University,[21] that the openings of the chambers must be large enough to radiate the sound energy into space. He further states:[21] "We are talking of what artists, teachers of the voice, and others have designated as 'resonance.' A voice with good carrying power is said by them to be 'resonant'."

More recently, he continues:[22] "Some otolaryngologists and others have insisted that when singers develop sinus infections, the carrying power of their voices is materially reduced. Unfortunately such subjective impressions . . . without objective measurements of the exact amount of loudness variation . . . must be of questionable value. Furthermore (other factors may be involved), it is a well known fact that the tissue in the neighborhood of the turbinates . . . tends to become congested

and inflamed to such an extent that a radical muffling effect is inevitably brought to bear on any tone which normally is passed through the nose. Since a substantial part of the consonants, such as *m*, *n*, etc., and some of the vowels, regularly call for an opening of these passages, their loudness must of course be affected, and any aria, song, or other connected word singing would thereby be radically modified. Furthermore, since the posterior part of the nasal passages would be open and the anterior closed, any tone which entered the cavity would be caught in a closed cavity muffler. We know that closed tubes of this type respond only to the odd numbered partials, and where loud vibrations are set up in them, a very disagreeable nasal quality results . . . Anyone can demonstrate this fact for himself by pinching his nostrils while he intones a rapid succession of syllables in which a hummed *m* is coupled with various intoned vowels such as *mah-mah-mah*, or *me-me-me*. In all probability, however, he will find some vowels less disagreeable such as *moo-moo-moo*. The reason is probably to be sought in the fact that the high partials are practically absent in the *moo*. . . and strongly present in the *me*. In this case the sinuses are all still present, so the reduced loudness and bad quality cannot be blamed on them."

"If the sinus had any function at all, it might well be expected to produce exactly such a dissonant effect. For, it has but one small opening and no power of varying its capacity. Consequently it could by no means blend in harmonic relationship with the other elements in a complex tone which was always changing its fundamental pitch as it does in a scale or song. If such a sinus did serve as a 'resonator,' it would boom out whenever its pitch were encountered in a scale, and sink on all other pitches. The result would be hideous."

"In a demonstration before the Chicago Council of Teachers of Singing, June 12, 1934, . . . our apparatus for measuring the effective loudness and quality modification where the laryngeal tone was produced was set up: *1*. in the cadaver; *2*. in the cadaver head with one and then both antri opened up and removed; *3*. with the frontal sinus removed; *4*. with the sphenoidal sinus removed; *5*. with the whole top of the head, including all the nasal passages, cut off and nothing but the buccal passage or megaphone left; *6*. with the whole head removed. Since the air pressure and glottal tension was kept on absolute constant for all experiments, an exact experimental comparison of effects could thereby be obtained . . ."

"Practically no loudness change could be discovered by either the presence or removal of any of the sinuses. Nor could any quality differentiation be detected. However, when the whole top of the head was removed, including the nasal passages, the resultant tone was distinctly less mellow and far more blatant . . . and loud . . . For in this case the glottal tone was concentrated through the mouth functioning as a megaphone, flaring progressively from the small opening over the larynx to the lips with most of the superimposed mellowing modifiers removed."

All of this is leading up to the statement that the present-day theory of the nasal cavity and accessory nasal sinuses acting as "resonators" for the human voice is incorrect, and that they can serve at best, if at all, only as "modifiers" of the voice.

It would seem that that long assumed function of resonance is no longer to be ascribed to the sinuses for the following reasons: The small openings of the sinuses limit sufficient back and forth surge of air to adequately radiate sound waves into space; they are tuned to only one pitch; they are lined with a soft moist covering which would tend to the absorption and deadening of sound waves. This is indeed gratifying to the cleft-palate surgeon who has in so many instances been accused of not having restored the "nasal resonance" by his operation.

We know that in all patients with a double complete cleft palate, the nasal septum is always irregular after operation, no matter what technique has been used. We know that most of these patients have hypertrophy or other irregularities of the turbinates (inferior) which limit the normal nasal breathing.

The disagreeable quality of the voice of a person having a marked nasal obstruction from one cause or another has been termed "increased nasal resonance" by many. If we discard the idea of this cavity as a resonator and consider the obstructed nasal cavity and possibly an inactive soft palate (making the nasopharynx a "dead cavity") as acting on the passage of sound waves, as an obstructive middle ear disease does in hearing, we shall be in agreement with what seems now the demonstrated and objective scientific experimental evidence.

The waves, rebounding from the obstructed cavity or unclosed nasopharynx into the oropharynx, mix with the other voice sounds and, by neutralizing some and modifying others, produce an unpleasant voice quality.

All of these factors, together with the loss of our idea of "nasal resonance," give us an explanation of some of the speech defects in cleft palate patients who have been carefully operated.

SUMMARY.

1. Periodic observation of the patient from time of birth up to the time of operation has been a distinct advantage.

2. In addition to the usual preoperative examination made for surgical cases, other special ones must be made. This is particularly important in patients two years of age or younger. The results of the various examinations should be carefully correlated by the surgeon himself to look for isolated facts as elements of an unsuspected and possibly important contra-indication to operation.

3. Special preparation of the patient for some time before operation reduces the postoperative reaction to a minimum.

4. Intelligent attentive nursing under the direction of a dependable supervisor, experienced in the case of this class of surgical patients, is absolutely necessary.

5. Early closure of clefts of the alveolar process and clefts of the hard and soft palate before the onset of speech is advisable.

6. Speech training should be begun soon after operation. It is a long process but much can be accomplished by a competent instructor if full co-operation can be secured.

BIBLIOGRAPHY.

1. DORRANCE, GEORGE MORRIS: The Operative Story of Cleft Palate. Saunders, Philadelphia, Pa., 1933.

2. IBID.

3. IBID.

4. WISEMAN, B. K.: The Induction of Lymphocytosis and Lymphatic Hyperplasia by Means of Parenterally Administered Protein. *Jour. Exp. Med.*, Vol. LIII, No. 4, pp. 499-510, 1931.

5. CONNELL, F. G.: Liver Deaths (so-called), Rapid High Temperature Deaths. *Ann. of Surg.*, Vol. C, No. 2, pp. 319-327, 1934.

6. IBID.

7. EISS, STANLEY: Conservation of Hepatic Functions in Gall-Bladder Operations. *Ann. of Surg.*, Vol. XCVIII, No. 3, pp. 348-353, 1933.

8. SHEARER, JOSEPH P.: Mortality Following Gall-Bladder Surgery. *Ann. of Surg.*, Vol. XCVIII, No. 6, pp. 1114-1115, 1933.

9. STRAITH, C. L.: Plastic Surgery: Its Psychological Aspects. *Jour. of Mich. State Med. Soc.*, Detroit, Mich., Jan., 1932.

10. BROPHY, T. W.: Cleft Lip and Palate. p. 142, Blakistons, Philadelphia, Pa., 1923.

11. IBID: pp. 143-155.

12. IBID: pp. 156-217.

13. DAVIS, W. B.: Some Types of Harelip and Cleft Palate Deformities and the Operative Results. *Surg., Gynecol. and Obstet.*, pp. 704-709, May, 1926.

14. SHEARER, W. L.: Cleft Palate and Harelip. *Minn. Med.*, p. 293, May, 1921.

15. MAKUEN, G. HUDSON: Chapter in Oral Surgery by T. W. Brophy. p. 729. Blakiston, Philadelphia, Pa., 1916.

16. RUSSELL, G. OSCAR: Speech and Voice. *Dysphonia, Volta Rev.* 1934. MacMillan, 1931.

17. TRAVIS, LEE: Speech Pathology. pp. 53-54. Appleton, 1931.

18. RAVIZZA, F.: Psicologia della lingua, p. 72. Bocca, 1905.

19. WUNDT, WILH.: Völkerpsychologie — I. Die Sprache., p. 286. Kroner, 1921.

20. DORRANCE, GEORGE MORRIS: The Operative Story of Cleft Palate. p. 441. Saunders, Philadelphia, Pa., 1933.

21. RUSSELL, G. OSCAR: Physiological Cause of Voice Quality in Singing. *Carnegie Institution Publications*, No. 29, p. 416, 1929.

22. RUSSELL, G. OSCAR: Physiological Cause of Voice Quality Differences. *Carnegie Institution Publications*, No. 33, 1933-34.

681 East Broad Street.

ONE HUNDRED SEVENTY-NINE FOREIGN BODIES IN THE FOOD PASSAGES.

DR. GEORGE O. CUMMINGS, Portland, Me.

This report is based on the study of the cases of 179 individuals who had foreign bodies in the pharynx, esophagus or gastrointestinal tract and were seen at the Maine General Hospital or in private practice. It is a review of the problems arising from the lodgment of foreign bodies in the food passages as a whole, for, although the attention of endoscopists has been centered upon the esophagus, such objects may also become fixed in the mouth, pharynx or pass to the gastrointestinal tract; it is particularly concerned with the etiological factors, diagnosis and management of these cases; for purposes of discussion it falls into three major divisions — pharyngeal foreign bodies, esophageal foreign bodies and gastrointestinal foreign bodies.

PHARYNGEAL FOREIGN BODIES.

Seventy foreign bodies were removed from the pharynx. Sixty-two fish bones were found in this region and eight other objects were so observed. The average age of the patients who had fish bones in the pharynx was 29 years, while the average age of those having similar esophageal foreign bodies was 39 years. The obscuring of sensation in the mouth by false teeth is a factor in the ingestion of foreign substances. Forty-one per cent of the patients with pharyngeal and 47 per cent of those with esophageal foreign bodies wore artificial dentures. In addition to the fish bones two large open safety pins, an electric insulator, and a piece of a baby's rattle were removed. Two other patients presented themselves as they had swallowed fragments of glass. It was found buried in the tonsil in each case.

The cases of four patients seen because of the sensation of a foreign body in the throat are of interest. One had a tender adenomatous thyroid which caused a deviation of the barium

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, Dec. 2, 1935.

column on X-ray examination. The sensation of the foreign body disappeared when the acute swelling subsided. Another complained of feeling an extraneous substance in her throat after eating cinnamon cookies. Examination showed that she had an edema of the arytenoids — probably the result of an acute infection. Two other individuals with similar complaints proved to have malignant disease. One having a squamous celled carcinoma at the base of the tongue and the other a lesion of lymphosarcoma in the postarytenoid region.

Painful swallowing produced by foreign bodies in the pharynx is never as great as that caused by similar substances in the esophagus. Patients localizing these objects above the level of the thyroid cartilage, are able to distinguish the affected side but frequently are indefinite as to their level.

When search is made for pharyngeal foreign bodies the nasopharynx, oropharynx, tonsils, base of the tongue, vallecu-lae, pyriform sinuses and larynx should be inspected with direct vision or laryngeal mirror. Fish bones are often difficult to see as they resemble strings of saliva. At times they are so driven into the tissue that only a small portion presents on the surface. When a foreign body cannot be seen, the suspected area may be palpated with a probe or finger.

SIXTY-TWO FISH BONES AS PHARYNGEAL FOREIGN BODIES.

Location: Tonsil, 29; pharynx, 9; back of tongue, 8; side of tongue near epiglottis, 7; between tongue and epiglottis, 6; through epiglottis, 1; larynx, 1; uvula, 1; nasopharynx, 2.

A curved hemostat is the most useful pharyngeal foreign body forcep.

ESOPHAGEAL FOREIGN BODIES.

Ninety-three foreign bodies occurred in the esophagus in this series. Thirty-five different substances were found, 61 necessitated esophagoscopies at which 47 foreign bodies were removed. In the 14 remaining cases in which esophagoscopies were performed six abrasions were found, two foreign bodies slipped down before the passage of the esophagoscope, no foreign bodies nor abrasions were found in four instances, and the parents of one child signed a release and took the patient from the hospital before a second esophagoscopy could

be performed. There were no deaths nor morbidities. In 33 cases, esophagoscopies were not performed. In nine instances relaxation with morphine permitted the foreign material to pass; one child vomited the foreign body while undergoing a mirror examination; nine were X-rayed because of the strong presumptive evidence of the presence of foreign bodies; six were not X-rayed and seven vomited the foreign substances after taking ipecac.

Patients usually localize foreign bodies in the esophagus below the level of the thyroid cartilage.

When the presence of a foreign body in the esophagus is suspected, the extent and thoroughness of the examination depends upon the type of the foreign body, the age of the patient, the presence or absence of false teeth, the time that has elapsed since the accident, the degree of the painful or difficult swallowing and the possible presence of hoarseness or dyspnea. A careful examination of the oro- and hypopharynx is made in all cases. X-ray examinations are made when indicated by the history of the case. Esophagoscopies are performed when warranted by history and X-ray examination. Adult patients with suspected foreign bodies are usually given an opiate and put to bed to see if the foreign body will pass with the subsequent relaxation.

Bones and Similar or Smooth Objects: This group of 52 esophageal foreign bodies comprises 41 bones and 11 other similar or smooth objects.

Bones and similar objects offer the most difficult problems in diagnosis. The question as to whether such foreign bodies have found lodgment in the esophagus or have passed into the stomach leaving abrasions that cause abnormal sensations on swallowing is often difficult to decide. Fish bones usually lodge in the pharynx, 64 having been so located in this series. They occur less frequently in the esophagus, 16 having been so found. Esophagoscopies were performed in 12 instances, three bones were removed, one slipped down before the advancing esophagoscope, six abrasions were discovered and in two instances no bone nor abrasion was seen. Twenty-five chicken, pork, lamb or beef bones occurred, necessitating 13 esophagoscopies. Twelve bones were removed and one passed down before the advancing esophagoscope. None of the following substances needed esophagoscopies: Two orange seeds, grape-

fruit seed, splinter, piece of glass, two pieces of twigs, crab shell, finger nail, broken whistle and tack.

Forty-seven per cent of the individuals in this group wore artificial dentures.

The ages of these patients varied between 4 and 80 years, with an average of 39 years.

The number of days that elapsed after the swallowing of bones or similar objects until the patient consulted a physician varied. Patients from whom such objects were removed by esophagoscopy were seen on the first or second days, those in whom abrasions were found at esophagoscopy on about the sixth day and those in whom neither abrasion nor bones were found on about the seventh day or later. The remaining individuals presented themselves on the first or second days, with the exception of one patient who presented himself at the end of five weeks and on whom X-ray examination was negative.

Painful swallowing in some degree was present in all of these 52 cases. It is of particular significance when it is accompanied by grimaces. It was marked in all but one of the patients who were esophagoscoped. This individual was an edentulous woman of 50 years, who, when eating fish, felt something lodge in her throat below the level of the thyroid cartilage. A physician attempted to remove the bone with a bristle probange and succeeded in pushing it down to mid-esophagus from whence it was removed by esophagoscopy. Her discomfort on swallowing was moderate and localized in the mid-scapular region. It was moderate or mild in the remaining cases.

Difficult swallowing is a symptom of less importance. Of the 26 patients in this group who underwent esophagoscopy, two were unable to swallow and saliva was seen in their pyriform sinuses on mirror examination, 16 took liquids only while the others swallowed both liquids and food. The 26 individuals in whose cases esophagoscopy was unnecessary took both liquids and foods, except two patients who vomited the offending bones after taking ipecac.

Slight dyspnea was noted in one apprehensive patient.

Hoarseness occurred in two individuals from whom bones were removed.

X-ray studies were made in 30 of these 52 cases. Such examinations included films taken in the anteroposterior and lateral planes of the neck and chest, of the abdomen when indicated and fluoroscopy with or without the ingestion of a thin or thick barium mixture. A barium filled capsule was used in few instances. The presence or absence of the shadow of a foreign body, the swallowing function, the deviation or splitting of the barium column and the width of the esophagus at the seventh cervical vertebra were noted.

X-ray studies were made on 14 of the 15 individuals from whom bones were removed. Shadows of the foreign bodies were seen in 10 instances. In all 14 of these cases the barium column divided about the foreign substance. The average width of the normal esophagus in adults at seventh cervical vertebra is .9 cm.[1] It measured from 1.2 to 2. cm. in all but two instances. In one, the foreign body was a large soft fish bone with a portion of the gill attached and in the other a large flat chicken bone was found. In the six cases in which abrasions were found at esophagoscopy five X-ray studies were made; two were negative and three showed a splitting of the barium column and an increase in the width of the esophagus at the seventh cervical vertebra, the measurements being 1.4, 1.6, and 1.8 cm. In the remaining cases the X-ray studies were negative, except in one patient who underwent X-ray examination only, the width of the esophagus at the seventh cervical vertebra was 1.3 cm. This individual had noted mild pain on swallowing and was felt to have an abrasion only.

The postoperative temperatures were normal. In three instances the preoperative temperatures ranged from 100 to 101.

Five of the 26 esophagoscopies were performed with no anesthesia; six were so started but changed to general anesthesia, and the remaining 15 commenced and carried out under general anesthesia.

The 15 bones that were removed were lodged at the entrance to the chest except one which was in midesophagus.

An esophagoscope rather than an esophageal speculum was used in all cases.

Seven early cases were given ipecac and the foreign bodies were vomited. Esophagoscopy is safer and has much to

commend it. This idea originated from the case of a child who vomited a portion of a whistle from the esophagus when undergoing a mirror laryngoscopy.

Three bones passed into the stomach after the patients were relaxed by morphine.

Discs: Fifteen flat discs occurred as esophageal foreign bodies in this series; seven pennies, one nickel, one quarter, three buttons, one tiddledewink, one metal disc, and one wire ring. All lodged at the entrance to the chest, except one penny which was located in midesophagus. The age distribution was four at 1 year, five at 2 years, two at 3 years, three at 4 years, and one at 5 years. Five were seen on the day of swallowing, four on the second day, two on the third day, one on the seventh day, one on the twenty-first day, and two at unknown intervals. Those little patients who were old enough complained of discomfort at the entrance to their chests. Dyspnea occurred in two individuals. Eleven were able to swallow soft solids and liquids while four were unable to swallow. X-ray diagnosis presented no difficulties except that one button cast so little shadow that it was not seen until a similar button had been X-rayed on a film outside the body. Three cases were unsuspected until the foreign bodies were seen by X-ray. Two chest pictures were taken because of unexplained dyspnea and one because of long continued nausea and vomiting. These foreign bodies were all removed except one. This occurred in a child, age 2 years, who was brought to the out-patient department because of long continued dyspnea. X-ray pictured the shadow of a disc at the entrance to the chest. Esophagoscopy revealed a button buried in granulation tissue on the anterior wall of the esophagus just below the cricopharyngeus. It could not be grasped and it was intended to make another attempt at removal in a few days but the parents signed a release and took the child home, where it was reported to have died from pneumonia some months later. These cases with one exception were done under a general anesthesia. The preoperative temperature was normal in nine patients and in the others ranged from 100 to 103°. The postoperative temperatures were normal.

Two cases are worthy of mention. One of the children with an unsuspected foreign body, a penny, was X-rayed because of dyspnea. The 4-year-old child who had nausea and vomiting

practically since birth, was undiagnosed until X-rays were taken. There was no history of the child having swallowed a foreign body. The penny was found in midesophagus, shiny and bright, held in place by granulation tissue. After it was removed it was seen to be about one-half the thickness of a new coin. It is believed that it acted as a damper in a funnel, sometimes obstructing the entrance of food and again after stomach content was regurgitated, holding it in the esophagus until the action of the gastric juice eroded the copper and kept it bright. X-ray examination five weeks later revealed some narrowing at the point of lodgment. The child is now under treatment for a traumatic stricture.

Safety Pins: Nine pins occurred as esophageal foreign bodies, eight were safety pins and one, a brooch pin. Of these patients four were less than a year old while the others were 22 months, 2 years, 3 years, 5 years, and 58 years. Three were seen on the day of the accident, five on the second day and one on the third day. There was no difficulty in interpreting the X-rays which were taken in each instance. The keeper of the pin could be seen behind the larynx in one patient. A child-size laryngoscope and an alligator forcep were used in its removal. The brooch pin in a 5-year-old child and the safety pin in a 53-year-old edentulous woman were point down at the entrance to the chest. The pins in the remaining cases were point up. One was at the entrance to the chest while the others overlay the second, third, fourth, or fifth dorsal vertebra. In four instances the pins were grasped after their points had been manipulated into the lumen by the lip of the esophagoscope and withdrawn with the keeper outside. One pin was grasped by the spring and rotated in the stomach. General anesthesia was used in all but two cases. The pre- and postoperative temperatures were normal.

Boli of Food: Boli of food found lodgment in the esophagus in 11 patients in this series. In eight instances elderly persons whose ages ranged from 58 to 80, who were edentulous, endeavored to swallow too large mouthfuls of meat or fish. One child, age 2 years, had a bolus of meat lodged in its upper esophagus, a child, age 11 years, had a similar bolus lodged over a lye stricture which occurred seven years before and another patient, age 58 years, who had been unable to swallow any solids for two months, filled up with a chicken dinner over a carcinomatous stricture before coming from a neighboring

community to have the cause of her dysphagia investigated. These patients were seen on the first or second days after their accidents. It is interesting to note that one old gentleman made two trips to the hospital at an interval of four years for the same disability. All of these patients showed saliva in their pyriform sinuses. X-ray study was made in only those individuals with stricture and carcinoma; in the remaining seven cases the obstruction passed into the stomach after relaxation with morphine.

Miscellaneous Foreign Bodies: Six miscellaneous foreign bodies occurred in this series; a clam shell, collar button and orange seed, thumb tack, blueberry and two prune seeds.

The collar button and orange seed occurred as unsuspected multiple foreign bodies in a 7-month-old infant. This child was X-rayed because of fractured ribs and the shadow of a collar button was seen in the esophagus at the entrance to the chest. When, under general anesthesia, an esophagoscopy was performed, an orange seed was discovered over the collar button. The child apparently had no difficulty in swallowing before these objects were removed.

The blueberry occurred as a foreign body in a 2-year-old baby. When the child was 8 months old it swallowed a wooden collar button. It was X-rayed in a neighboring town and no abnormal shadows were seen. Eight months later it vomited the collar button. Another eight months passed, and three days before its entrance to the Maine General Hospital it was unable to swallow. At fluoroscopic examination the barium column formed above a stricture in the midesophagus. At esophagoscopy under no anesthesia, a stricture was found at this region which admitted a No. 14 French bougie. On a shelf beside the stricture was a blueberry that acted as a ball valve.

A prune seed occurred as an unsuspected foreign body overlying an unsuspected nonmalignant stricture in an edentulous woman of 80 years. For some months she had had difficulty in swallowing. X-ray examination after the ingestion of barium showed an obstruction a little below the entrance to the chest which closely resembled a carcinomatous stricture. A month later her physician was persuaded to permit an esophagoscopy, and under no anesthesia a plum stone was

removed from above a funnel shaped stricture which admitted a No. 16 French bougie. She had no recollection of having eaten prunes in the preceding months. She gave a history of a sudden difficulty in swallowing 26 years before and she again had acute dysphagia six years before, since when she had eaten chopped food. The cause of the stricture is unknown. She is living and well, three years after the removal of the prune stone.

FOREIGN BODIES IN THE GASTROINTESTINAL TRACT.

Sixteen foreign bodies in this series were located in the gastrointestinal tract. They were all metallic and were found on X-ray examination. The ages of these patients varied between 6 months and 6 years, except that three were 27, 28, and 65 years of age respectively. These objects included two pennies, two common pins, one shawl pin, one needle, two tacks, one nail, three closed and four open safety pins. In all but one of these cases a physician was consulted because the patient or his parents realized that a foreign substance had been swallowed, rather than because of the symptoms it provoked. One individual, however, an edentulous man of 65 years, swallowed a one and one-half inch nail. He complained bitterly of painful swallowing, localized below the level of the thyroid cartilage. X-ray showed the shadow of the nail in the stomach. These substances passed by rectum in from two and one-half to six days. Three cases are worthy of mention. A child, age 7 years, swallowed a penny and an X-ray taken on the same day in a neighboring city revealed the shadow of the coin at the entrance to the chest. The next day the child was brought to Portland and the shadow was seen in the stomach. A man, age 28 years, swallowed a tack at noon. He was X-rayed elsewhere and the shadow was seen opposite the seventh cervical vertebra. The next day he was brought to the Maine General Hospital and re-X-rayed when the shadow of the tack was observed in the small intestine. The width of the esophagus, however, at the seventh cervical vertebra was 1.2 cm., suggesting the presence of swelling at its temporary lodgment.

A child, age 6 years, swallowed a medium-sized open safety pin in the morning. X-ray examination showed the shadow of the pin open at an angle of 170 degrees point upward, partly

in the esophagus and partly in the stomach. Two hours later the shadow showed in the stomach. It was felt that a pin so widely open could not pass through the pylorus and duodenum. The surgeons were persuaded to do a gastrostomy. The pin could not be found in the stomach but was felt in the third portion of the duodenum. It passed by rectum in six days and the child made an uneventful recovery. Most gastric foreign bodies pass by bowel. Little harm comes from watchful waiting.

REFERENCE.

1. HAYS, P. D.: The Neck. *Ann. of Roentgenology*, Vol. IX, Paul B. Hoeber, Inc., New York, 1930.

47 Deering Street.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

The annual meeting of the American Laryngological, Rhinological and Otological Society will be held in Denver, May 18, 19, 20, 1936. Address all communications to Dr. C. Stewart Nash, Acting Secretary, 708 Medical Arts Building, Rochester, New York.

NEW YORK ACADEMY OF MEDICINE.

SECTION OF OTO-LARYNGOLOGY.

Meeting of Nov. 20, 1935.

A.—Present Status of Otitic Meningitis. Dr. James G. Dwyer.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

B.—Perilabyrinthitis. Dr. Marvin F. Jones.

C.—Preliminary Report on an Operation for the Relief of Double Abductor Paralysis. Dr. John M. Lore.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

D.—Perforation of the Cervical Esophagus and Its Management. Dr. David H. Jones.

E.—Galvanic Ionization Therapy in Allergic Rhinitis. Dr. Henry A. Barrett.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

F.—Plastic Repair of Hypertrophied Nose. Resume of Motion Picture Demonstration Herewith. Dr. Clarence R. Straatsma.

B.—Perilabyrinthitis. Dr. Marvin F. Jones.

The material for this paper was included in a paper entitled "The Pathology of Petrositis," read as part of a symposium before the American Otological Society and published in the Annals of Otology, Rhinology and Laryngology, p. 1036, Dec., 1935.

This material was also included in a graduate lecture course given before the American Academy of Ophthalmology and Oto-Laryngology in Cincinnati, September, 1935, and published only in abstract form in a phamphlet.

D.—Perforation of the Cervical Esophagus and Its Management. Dr. David H. Jones.

Management of cases with perforation of the esophagus places an unusual responsibility on the surgeon — whether to operate or pursue the plan of watchful waiting. In many of these cases operation is delayed until an abscess ruptures into the mediastinum, which is usually fatal.

The anatomy of this region was reviewed.

There are two methods of treatment: 1. Daily esophagoscopy with aspiration of pus from cavity. 2. External operation as soon as X-ray shows signs of periesophagitis or abscess.

The symptoms are: Fever, pain and swelling. Dyspnea caused by pressure on larynx is noted. Emphysema may come on slowly or gradually.

There are three different types of perforations which were shown with lantern slides.

Gastrostomy was not done on any of these cases, but a nasal feeding tube was inserted at the time of esophagoscopy and removal of the foreign body. X-ray films were antero-posterior and lateral (especially lateral), taken before

fluoroscopy with and without barium capsule or solution, then lateral after fluoroscopy.

X-ray films of suspected foreign bodies should be taken and read by someone familiar with this kind of an accident.

Eight case reports were given, one with perforation into the mediastinum. There were seven recoveries and one death.

DISCUSSION OF DR. D. H. JONES' PAPER.

DR. RAMSAY SPILLMAN: I told Dr. Jones that I was going to come here tonight and deny everything he said, but after his very complimentary allusions to the X-ray department, I feel I must abandon that idea. I was glad to have these very kind words because I do not know where one can develop such an inferiority complex so easily as in doing foreign body work on a bronchoscopic service. Many of the bones are from young animals, and bones are not very well calcified, so the only way we can show them is to have a coating of barium adhere to them after barium has been swallowed. I have not gone over our statistics on positive and negative results. If I had, I would probably have even more of an inferiority complex. Perhaps you noticed in the slides of the esophagus cases presented that the patient's teeth were very deficient. I believe one of the prevalent causes for the lodging of foreign bodies in the esophagus is the fact that these patients not only have an inadequate chewing apparatus, but many of them have upper dentures which abolish the tactile sense of the upper part of the mouth, and, therefore, they are not conscious of the bones they swallow until too late. Certainly our experience at the Manhattan Eye, Ear and Throat Hospital, which is a clearing house for foreign bodies in that section of the city, makes me wish the principles advocated by Fletcher a number of years ago were more generally adopted. I would not want a chicken in every pot, because the number of chicken bones we get, even in these bad times, is tremendous.

Dr. Jones, not only here but elsewhere, has been very complimentary about the co-operation between the X-ray department and the bronchoscopic department. I think he is making a virtue of something which should go without saying, because if we did not co-operate we ought to be run out and someone else gotten who would. Our problems are identical and we are only employing different means for the solution of the same problem, that is, the relief to suffering humanity. Co-operation is particularly necessary in the biplane fluoroscopic cases. I do not know anything more exciting or dramatic than being a party to this procedure. The Notre Dame final touchdown does not compare with the concentration under which everyone works and the enthusiasm with which the recovery of the foreign body is greeted.

Due largely to the work of Dr. Percy Hay in the Pancoast Clinic in Philadelphia, we have come to know considerably more than we used to about the indirect evidence of foreign bodies in the esophagus. Hay's work is extremely important and is published in a small volume entitled "The Neck," published by Hoeber. That book has been very useful to us and we use the measurements laid down by him for the thickness of the neck tissues in relation to the vertebrae. In cases where foreign bodies cannot be directly demonstrated, we know that the normal retroesophageal tissues should be of a certain thickness, while the patient's tissues are increased in thickness. There are varying degrees of size and ease of demonstration of foreign bodies in the esophagus. It does not take any great diagnostic skill to recognize the presence of a bone, such as the one Dr. Jones showed in the Italian patient in which the bone was about 3 cm. long. We diagnosed that in a fraction of a second when it was seen on the fluoroscopic screen and made a film for the record. Unfortunately, we did not make an anteroposterior film, but it has been our experience that a foreign body in this position is superimposed on the vertebrae and its shadow is usually lost.

It has been extremely instructive to be associated with Dr. Jones and his co-workers in the hospital. We do have an esprit de corps and pride ourselves on it. There is a friendly rivalry between the X-ray department and the

bronchoscopic department, but while there is a great deal of banter that would lead a stranger to think we were the greatest of enemies, there is a deep friendship and co-operation under it all. It has been inspiring to work with such men as Dr. Jones and the others in the clinic. We have developed a routine which is based quite firmly on the work of Jackson in the examination for foreign bodies. I can readily see how even experienced Roentgenologists, who have not had the benefit of an experience in a hospital where they see many foreign bodies, can fail to recognize foreign bodies, because there is a very definite routine which must be followed, step by step, and if not followed completely, usually leads to failure. Even with our routine as thoroughly as we have it worked out, we sometimes fail to demonstrate foreign bodies, which are later recovered by the esophagoscopic department. We therefore, in apparently negative cases, base our opinion on the words of St. Paul: "Therefore judge nothing before the time, until the Lord come, who will bring to light the hidden things of darkness."

DR. JOHN M. LORE: Dr. Jones asked a question about the feeding tube in these cases. I think he brings out an important point. The smaller the feeding tube, the better. Occasionally you do get a chondritis from pressure and when you get a chondritis, it is hallelujah!

Flushing the wound with salvarsan brings up the old moot question of salvarsan in Vincent's angina. I don't think it is worth anything. I would rather use peroxide. I do not think it is the effect of the salvarsan, but is due to the flushing, and the introduction of air or oxygen. In cases of Vincent's angina we have been able to get the same results from using sterile water.

Dr. Jones did not mention the question of complications. Whether you operate or do not operate, there is the question of recurrent laryngeal paralysis. That is important in making any prognosis to the patient. Whether you go in on the left or the right has nothing to do with it. It is due to the scar tissue which forms around the esophagus. Do not forget that an esophageal abscess is really a mediastinitis. The infection goes down into the posterior mediastinum. We have done a tremendous amount of work on this, both in the human and on the cadaver. We gave a demonstration this afternoon at the Manhattan Eye, Ear and Throat Hospital on the cadaver. The approach is by an incision along the anterior border of the sternocleidomastoid muscle, starting at the cricoid and going down to the sternum, keeping inside the carotid sheath. At about the level of the thyroid gland you may come across some veins and arteries which you may have to ligate. In doing a cadaver demonstration you get a beautiful display of the anatomical parts. In the human you do not get this. The tissues are all matted together. It is important to keep inside the carotid sheath. You are bound to get pus. In all our cases in which we went in externally we have found pus. We have never been disappointed. When you do this work, have the courage of your convictions. Do not hope that the pus will rupture through the esophagus. It may not do that. You won't always get away with it. I think we must cast aside our prejudices against external operation. The first consideration should be the patient's life. Once having made a diagnosis of periesophageal abscess, have the courage of your convictions and go in externally. Once you strike pus, the rest is comparatively easy.

DISCUSSION OF DR. BARRETT'S PAPER.

DR. LOUIS HUBERT: In order to save time I have put down a few remarks in the consideration of this subject. The laryngologists are interested in a number of questions which they would like to have answered. First, in what kind of cases should this treatment be used? Second, how does this treatment act? Third, is it safe? Does it not destroy the function of the nasal mucous membrane? Fourth does it cure, and if not, what does it do? Fifth, how can we explain the discrepancy in the findings of some laryngologists and immunologists, and is there a justification in attempting this form of treatment?

Taking up the first question, in what kind of cases should this treatment be used: should it be used in all allergic cases? I believe all cases should be

thoroughly studied first, and we should try to find the underlying cause of the allergy, but many cases fail with specific immunization and I think these are the cases that should be subjected to this form of treatment.

Secondly, as to how this treatment acts, we do not know how it does act, but in all probability there is produced a break in the reflex arc from the nose to the secretory motor center in the medulla by a local action on the nerve endings in the nasal mucous membrane.

As to the third question, Is it safe? Some observers have claimed no destruction of the nasal tissues, others have produced extensive nasal changes in experimental animals. So far as we know, there are no deleterious results in the cases we have treated. However, we cannot tell anything about this subject until about five or six years have elapsed and enough cases have been studied.

Does it cure? We believe this treatment is only a palliative, more or less prolonged, and it does not cure. The first cases I treated were at the beginning of 1934 with the Warwick apparatus, and the results to me were immediately very good. In the first two or three months, almost 90 per cent of the cases I treated got very enthusiastic about it. They felt relieved, but at the end of that time most of them had a recurrence of their symptoms. However, they were satisfied and wanted to undergo the same treatment again because they thought the relief justified it.

As to the question of the discrepancy between the findings of some laryngologists and immunologists, those who were at the recent graduate fortnight of the Academy of Medicine heard Dr. M. A. Ramirez, who is a well known immunologist, in an article, entitled "Allergy in Relationship to Diseases of the Respiratory Tract," condemn this treatment as worthless. There are a number of reasons why it would not appeal to an allergist. I do not want to go into those reasons, but the laryngologist calls to the patient's attention the marvelous results that are obtained by this new method of treatment and I think the patient's mind is open to it. The allergist, however, is skeptical and uses this method in a number of cases to prove it is useless. Personally, I think we should guard against over-enthusiasm and exercise care in all cases of allergy until it is proved that no destruction of the nasal tissues is produced. It is true that some patients, suffering from allergic rhinitis, are resistant to all forms of treatment and respond to ionization. These patients are justified in having this treatment, and in these cases we recommend it.

DR. HAROLD HAYS: I have asked the chairman to allow me to make a few remarks because I have had probably as large a personal experience with ionization as anybody I know in New York City.

Regardless of the fact that ionization of the nose is not a new procedure, for it has been used for over 12 years, it has been brought to our attention particularly by Warwick, of Texas, and I have used the Warwick machine. I was as skeptical as anyone. I am not going to spend a lot of time in telling about the machine, but I wish to report on my own cases. In the past two years I have had 40 cases, 20 similar to those described tonight, 17 cases of hay fever and three of asthma. I used this machine a year ago last spring and I was very enthusiastic about the results. There was no question that I had excellent temporary results in hyperesthetic rhinitis. Then the hay fever season came along and I used it in a number of cases, sometimes before the season started and sometimes during the season. I hospitalized all the patients to see that they got the best of care. The results were so encouraging at the end of that year that I had the temerity to report those results last January. This summer I was so encouraged that I made a report at the Pan-American meeting. Then the hay fever season started again. I treated 12 cases and had failures in every one and I re-ionized two of the cases previously treated, with no results. We should not be too enthusiastic in cases of this type. In cases of hyperesthetic rhinitis I agree with the previous speaker that it is an excellent thing to use. In the cases of hay fever I think we have to be particularly careful, because we cannot promise results. I had hoped the time had come at last when the

otolaryngologist could say he had something specific to present to his cases of hay fever, but I am afraid he has not got it yet.

What are the ultimate results from this treatment? I agree that none of us know what happens. I have been rather fearful when I have seen the amount of material that has come away from the nose within a week of the treatment, but I believe there is no harm done, judging from microscopic studies which have been done in St. Louis. We cannot judge the results of this treatment from the results each individual has had thus far. It will be a matter of reporting over several years. Also we must be particularly careful not to include in those results the results from men who are not competent to pack a nose. I know this treatment is going to be used by incompetent men. Unless a man can pack a nose properly and see that the packing is in the right place, he will not get good results. It is manifestly unfair to make a charge to the patient until the patient is satisfied that he has a real reason for paying. Patients have been fooled so often. I think it is only fair to leave it to the patient whether he ought to pay you or not, because in some of these cases I have been almost ready to pay the patient for working on him, the results have been so poor.

In conclusion, I want to say that in the cases of hyperesthetic rhinitis this treatment is justified. In connection with some cases of asthma it is worth while. When it comes to the treatment of hay fever, I am rather skeptical as to what the results will be.

The Hypertrophied Nose — A Resume of a Motion Picture. Dr. C. R. Straatsma.

Plastic surgery is frequently called upon to correct the hypertrophied nose. This feat is not the simple procedure that the inexperienced are led to believe.

In 90 per cent of the cases of nasal hypertrophy a complete remodeling of the nose is necessary to obtain a natural appearing result. By complete, we mean the cartilaginous and bony ridge must be reduced in height, and the tip narrowed and elevated. The latter is accomplished by the partial excision of the lower lateral cartilages and the removal of as much of the end of the septum as is necessary to bring the tip to its proper height. To shorten the nose, the excess cartilage framework is usually taken care of by the removal of a portion of each upper lateral cartilage. And finally, the nasal bony process must be narrowed by separating the nasal arch at its base and refracturing the processes mesially.

The postoperative dressing should be of such material as to snugly hold the parts in apposition to the new framework, but not so severe as to cause pressure necrosis.

The after care is very important and generally consists of methods found best after considerable experience by the individual operator.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

SECTION ON OTO-LARYNGOLOGY.

Meeting of Nov. 8, 1935.

DR CHARLES CONNOR gave a lantern slide talk on "Some Diagnostic Aids in Oto-Laryngology," giving variations in the blood count in various conditions and also the cytology of the nasal secretion.

DISCUSSION.

DR. CHARLES CONNOR gave a lantern slide talk on "Some Diagnostic Aids in the ordinary white cell count should look up the article by Bryan and Gerry in the Oct. 6, 1934, number of the *Journal of the A.M.A.* They found that the count in 19 fields, taken from the same dilution, varied from 6,480 to 11,480.

DR. V. J. SCHWARTZ said Dr. Connor's mention of agranulocytic angina brought to mind the fact that two or three years ago there was a wave of reports of agranulocytic angina cases, and then quite suddenly the number seemed to diminish. It had been presumed that the recent increase in the use of barbituric acid products, with which was associated various other commonly used coal-tar derivatives, might have been responsible. At any rate it became fairly definitely established that the barbiturates themselves were apparently not responsible for the blood dyscrasia and that, if anything, the associated coal-tar products might possibly have been at fault. To him this is still open to question for, when it is recalled how widely used these products are, it would seem remarkable that there are not a great many more cases of this type of angina. True, there may be some persons who are sensitized to these coal-tar derivatives and develop damage to the bone marrow as a result. As a result of this controversy, Dr. Schwartz has investigated the field of postoperative sedative and analgesic medication rather thoroughly, and has found that the carbamide group, which are not barbiturates and are not associated with the common coal-tar products mentioned above, frequently are of great value in combating discomfort and insomnia and can be taken in reasonably small doses over a long period of time without any demonstrable disturbance.

As a matter of fact, at the General Hospital in Minneapolis, where one would expect to see a considerable number of such cases, very few are encountered. Two weeks ago Dr. Schwartz saw a case which had been admitted to the contagious hospital, moribund, and died within a few hours. The leukocyte was under 3,000 and a typical, deeply inflamed, punched-out ulceration was present in the pharynx. There was no question as to the diagnosis, but the matter of emergency treatment was of great importance. Two or three years ago transfusion was the treatment of choice. It seems that now transfusion is not so highly regarded. Some 70 cases were reported last winter in the *Archives of Otolaryngology*, in which Roentgenography was used with excellent results. The dose was 150 Roentgen units administered on three successive days, the first day to the anterior surface of the chest, the second to the posterior surface of the chest, and the third to the lumbar region. This order was adopted because it was found that the marrow in the anterior portions of the ribs and the sternum was most effective in white cell formation; that of the back of the chest, somewhat less so; and the lower part of the vertebral column least of these. The marrow of the long bones, it was stated, was not of great importance in leukocyte formation. The preparation known as pentnucleotid is also of value, but only if given early and in substantial doses.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

SECTION ON OTO-LARYNGOLOGY.

Meeting of Dec. 13, 1935.

DR. A. L. JUERS (by invitation) read a paper on "Lateral Sinus Thrombophlebitis." His conclusions were as follows:

Summary: 1. The incidence of the three types of sinus thrombophlebitis in mastoiditis is about 3.2 per cent.

2. The preponderance of cases occur between the ages of six and 30 years.

3. The mortality varies from 20 to 25 per cent, if the cases that are hopeless when first seen are excluded. Including these cases, the mortality ranges from 25 to 30 per cent.

4. The diagnosis is dependent on the picture of sepsis complicating mastoiditis and evidence of lateral sinus obstruction if an occluding thrombus is present.

5. The surgical treatment consists of removing the source of the infection, i.e., all mastoid cells, the diseased sinus wall, and the thrombus, if one is present. The necessity of ligating the internal jugular vein is questioned by some otologists.

DISCUSSION.

DR. V. J. SCHWARTZ felt this to be an important paper because it brings up a number of serious problems. He said he was a little astonished at what Dr. Juers had to say about the role of jugular ligation in the treatment of lateral sinus thrombosis. Dr. Schwartz had always felt that ligation could scarcely do any harm, and has believed in the proposition that if in doubt, the vein must be severed. He has a definite feeling, however, that one explanation for the untoward results in some cases in which the jugular has been ligated is the routine of the operation. Usually the infected mastoid is opened, the sinus wall is removed, then the customary methods of determining the presence and location of a thrombus are employed. Then the mastoid is temporarily covered and the surgeon turns his attention to the vein. It is often very difficult to keep the neck incision clean, especially in a field where there is considerable pus, and, as is often the case, a highly virulent type of organism.

DR. LAWRENCE R. BOIES reviewed briefly the postoperative cases shown to the members in the out-patient clinic before dinner. The details of history and treatment were supplied with the case record at that time.

Case 1. Brain abscess complicating scarlet fever in a boy, age 14 years. The interesting feature of this case was the fact that a mastoidectomy was performed one week after the ear was opened for an acute otitis. The mastoid cells were broken down in areas and when the mastoid had been completely exenterated, the middle fossa dura had been exposed through which an acute temporosphenoidal abscess was "leaking." Conservative treatment was followed for a week and then a Mosher drain was placed, following which recovery was uneventful for a period of two months. At the end of that time, the patient returned, complaining of headache and vomiting. Being acquainted with the original site of trouble, we immediately reopened the mastoid wound and inserted a brain needle to allow the escape of several cubic centimeters of rather thick greenish-yellow pus. Recovery was uneventful and the boy has been well for the past six months.

Case 2. Jugular bulb thrombosis following an acute exacerbation of a chronic otitis in a boy, age 18 years. When the mastoid had been completely cleaned out in this case, it was evident that there was trouble in the lateral sinus as indicated by changes in the sinus wall over the lower half of the sigmoid portion. The internal jugular vein was ligated and then the sinus opened to allow the escape of pus when a thrombus was released by probing toward the bulb. Free

bleeding had been obtained from the torcular end and this was controlled by the usual small gauze rolls. A small calibre soft rubber catheter was used to probe into the bulb and a short piece of this allowed to remain in place to insure patency for drainage. This method proved adequate to effect a cure.

Case 3. "Petrositis" in a boy, age 17 years, with a very large mastoid. The interesting feature of this case is the large amount of space posterior to the labyrinth through which the pyramid was drained. The X-ray studies shown you indicate the extensive cell structure evident before the primary operation and the appearance of the mastoid after the operation on the pyramid. The characteristic symptoms of this case were those of the Gradenigo syndrome, but the writer wishes to emphasize the fact that suppuration of the pyramid may occur without an abducens paralysis.

Case 4. Skin Graft: A technique for a radical mastoid cavity. A radical mastoidectomy was done on a boy, age 8 years, several months ago and, because he lives some distance away, he could not be seen at regular intervals after the operation. He returned recently for a check-up and it was found that the anterior half of the cavity was not covered with epithelium. This area was grafted after a method described by Cunning in the October, 1935, number of THE LARYNGOSCOPE. It consists in covering the skin with methylene blue and then a layer of flexible collodion. The graft is cut easily and can be handled without curling of the edges and then can be placed in the desired position. The methylene blue served to identify the graft very easily. A melted wax of special formula containing some naphthol and eucalyptus is then poured into the cavity and not disturbed for several days. You were shown the cavity several days after the wax had been removed. This is apparently an excellent bit of technique.

Case 5. Operation for protruding ears in a boy, age 19 years. The photographs taken before operation indicate plainly the type of ear treated; it was not distinctly macrotic. The Goldstein type of operation was done, in which two curvilinear incisions are made, one on the back of the auricle with the convexity of the curve outward, and a corresponding one over the mastoid process with the convexity of the curve toward the occiput. The skin is removed down to the perichondrium on the auricle and to the periosteum on the mastoid. An elliptical piece of cartilage is then removed and the cut edge of cartilage sutured back to the periosteum. The skin edges are then approximated. Aside from the judgment exercised as to the quantity of tissue to remove, the secret of success in making these ears stay back satisfactorily lies in the removal of the cartilage. The end-result in this case was very satisfactory.

Case 6. Carcinoma of the larynx. Two of the cases shown were men, each age 49 years, and had had symptoms in each case for about nine to 10 months. One had an extrinsic carcinoma which involved the ventricular band and pyriform sinus but was graded 2 by the pathologist; the other had a complete fixation of one cord with some subglottic extension. Both were operated on during July of this year (five months ago) and are well now and using an artificial larynx for speech. The third case was an old gentleman, age 70 years, whose growth was confined to the glottis but involved both cords. His advanced years and apparent senility made a total laryngectomy inadvisable. A thyrotomy was done after a preliminary tracheotomy and the growth was removed with surgical diathermy. Convalescence was uneventful except for feeding. At the end of three weeks he is still dependent on his nasal tube. This has resulted, no doubt, from the fact that both arytenoids were removed with the interior of the larynx. He will have to tube himself for a while, but should regain ability to swallow normally in time. The prognosis in this case can hardly be determined at the present time.

Case 7. Carcinoma of an antrum. This man, age 53 years, had a carcinoma of his right maxillary sinus which had broken through the palate. The growth was treated by removal of enough of the palate for adequate exposure, cauterization of the growth with surgical diathermy, and the postoperative use of radium and deep X-ray. It is nearly five years since this was done and there is no evidence of recurrence. He wears a dental plate specially constructed to fill in the defect in his palate.

(To be continued in a subsequent issue.)